The Builder.

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The New York National Academy of Design.

NEW YORK came forward nobly for the erection of a building for the Academy of Design, and that, too, at a moment when engaged in civil war. In the early part of the autumn of 1825, there was formed in the City of New York, a "Drawing Association," for art study and social intercourse, which embraced, among its members the greater portion of the artists then in the City. This Association prospered in such a degree, that it soon became necessary to extend its field of operations, and the result was the foundation, on the 19th day of January, 1826, of the present National Academy of Design.

The first Annual Exhibition of the Academy was held in the year 1826, on the second story of a building at the south-west corner of Broadway and Reade-street. One room only was occupied, and that a small one, being but 50 ft. long and 25 ft. wide. It was lighted in the evening by six ordinary gas-burners, and this is said to have been the first occasion on which gas was used for an exhibition of pictures. In 1850, the Institution purchased property, and a suite of six galleries was erected on it; and was so ably managed, that, after years of patient labour, it produced the first means of any amount ever in the possession of the Academy. After five years of occupancy, this property was sold for about one hundred and twenty thousand dollars, giving the Institution a clear return of sixty-nine thousand dollars, and leaving, after the payment of all outstanding debts, a balance of nearly sixty thousand dollars.

After wandering for some time, the Academy, in 1860, purchased a site, at the cost of 50,000 dollars, and invited designs from the leading architects of the city. The design submitted by Mr. P. W. Wight was selected, and steps were taken to appeal to the sympathy of lovers of art outside to raise the funds that would be required. With this end in view a new class of members was established, with certain stipulated privileges, on the payment of 100 dollars for a life-interest, or of 500 dollars for the same interest in perpetuity, with power in the latter case to transfer or to transmit it. The citizens of means and taste responded with such liberality, that after only a few weeks the council felt fully assured of being able to realize their plans in the amplest manner. Many men, indeed, with a munificence quite unexpected, contributed not merely the sums required by the terms of the fund, but in large excess of it; so as to leave no doubt of the successful completion of the new edifice and the endowment of the Academy in such a manner as to enable it to worthily achieve its important ends.

On the 21st of October, 1863, the first stone was laid, when several excellent addresses were made. One of the speakers, alluding to the mighty struggle in which they were engaged, as a tempestuous spring-time to which would follow a glorious summer of intellectual growths, said,—"May we not hope that out of the throes and convulsions of our darkened and strenuous present may be born a future of grandeur and radiance? Nay, may we not discern on the very smoke-wreaths of battle the same glorious bow of promise which the Divine Benignity paints on the storm-clouds when the tempest is overpast?"

"But, to attain that lofty consummation," the speaker continued, "our artists and our public must learn to estimate art in its true dignity and character, not as a frivolous pastime, like the antics of Harlequin; not as a minister to ostentation, like a fashionable upholsterer; not even as a better sort of schoolmaster, teaching a finer selfishness; but as, indeed, it truly is, the purest and best efforts of the purest and best minds in their purest and best hours. Art amuses us, it is true, like many meaner things, but it elevates while it amuses; it delights us, but it ennobles us through that delight; it instructs us, but it informs us, or forms us inwardly, while it instructs. The genuine products of a mysterious fusion, which blends the sense that sees all beauty with the wisdom that perceives all truth and the love that sympathises with all life, it has no other function and no other sphere than to speak to the whole of man's higher nature,—to his most exquisite sensibility, his shaping imagination, his penetrative reason, and his vivifying soul."

In 1865 the building was ready for occupation, and the 17th of April was named for opening it. On the 15th of that month the world was startled and saddened by the murder of President Lincoln, and the members of the Academy immediately passed resolutions expressive of their regard for the memory of their late chief magistrate, and postponed the inauguration till the 27th of the same month. On that day it took place, when the president delivered an address, and the venerable William Cullen Bryant, the poet, followed him with eloquence. He did not overlook the fact that the new building had an old one for a type; but saw in this "an historical congruity to the purpose it will serve, since it was for the adornment of buildings not dissimilar in style that the art of modern painting put forth its early efforts, and advanced to that stage of perfection which gave us the great colourists of the Venetian school." "I am confident in the expectation," he said, afterwards, "that a day of great glory for art in this country is at hand—a day of which we now behold the morning, coincident with the signal overthrow of a mighty and fearful conspiracy against our national existence, and with the near prospect of returning peace. The temperament of our people and the influence of our climate are, I think, highly favourable to the cultivation of the fine arts. Some quality in the air of our part of the world, which I do not pretend otherwise to define, promotes, unless I am greatly mistaken, the activity of those faculties which conspire to make the great painter and sculptor."*

The new building, of which we give an engraving,† stands at the north-west corner of Fourth-avenue and Twenty-third-street. It has a front of 80 ft. on Twenty-third-street, and a front of 98 ft. 9 in. on Fourth-avenue. The principal entrance is in the middle of the narrower front, facing southward. It is on the level of the floor of, what is called there, the second story (with us it would be the "first-floor"), and is reached by a double flight of steps.

On this story, as shown on the plan, is a wide hall, extending from the principal entrance nearly the whole length of the building, with stairs leading to the top story. To the right of this hall, entering the building, is a range of four large rooms, lighted by the eight windows which are shown in the engraving, and by the three windows of like design which open in the shorter façade. The first is a reception-room; the next two are used for the library of the Academy of Design; and the fourth is a meeting-room for the council or governing body of the institution. There are three similar windows to the westward of the main entrance. The first of these gives light to a treasurer's office, the others light a ladies' parlour. Behind these small rooms, is a lecture-room, intended to accommodate 300 persons; and with a private stairway, leading to the story below.

The stairs which lead to the upper story are in the centre of the building, occupying the whole width of the hall, and are an important feature of the interior. The top story is wholly occupied by exhibition galleries, conveniently arranged around the central staircase, and all communicating so as to admit of passage all round. These are lighted from the roof, and need no side windows, except in one gallery, which, being intended for sculpture, has a large north window. The circular openings, filled with tracery, shown in the engraving, are ventilators communicating with the picture-galleries.

The lowest story (called the first, on the plan) is principally devoted to the School of Design, but some rooms in it are intended for the residence of the janitor. The entrance to the School of Design is at the side. The three large double windows near it give light to three studios, which, with a large hall opening into them, are the rooms of the Antique School. Adjoining is the hall of the Life School, which is used only in the evening. This room, the lecture-room above it, and the sculpture-gallery, on the top floor, have windows opening upon a small court-yard, taken from the regular parallelogram which the plan of the building would otherwise occupy.

The interior of the building is well and expensively fitted up. The greater part of the woodwork is of oak, walnut, ash, and other hard woods, oiled and polished, so as to show the natural colour and grain. Each of the four large rooms on Fourth Avenue has an open fireplace, with a hearth of ornamental encaustic tiles, and a mantel-shelf of oak. The windows of the Library and other rooms are fitted with plate-glass in sliding sashes, and inside shutter-blinds. The rooms are connected by large arched openings, two of which are fitted with folding-doors, glazed with plate-glass. The vestibule at the main entrance is floored with an ornamental pavement of inlaid marbles of different colours; and the floor of the main hall is of walnut and maple, in ornamental patterns.

The Academy is the only Gothic building of any importance, other than a church, yet erected within the city limits, and is more richly decorated with sculpture than the exterior of any building in America. The double flight of steps leading to the main entrance—rendered necessary by the small size of the plot on which the building stands, a sufficient staircase within being an impossibility—is an ornament to the building. It is very richly carved with floral ornament, and is built almost entirely of white marble. It affords, also, a good place for the drinking fountain, which occupies a triple arcade under the platform of the stairs.

The walls of the lower story are of gray marble, from Westchester County, New York. The darker bands are of North River blue-stone, selected and smoothed pieces of the same stone as that of which the flags are made which cover our side-walks. The arches of the small windows of the janitor's rooms, in the Twenty-third-street front, are of white marble, the dark band of blue-stone passing over them. The little circles

* A Report of the proceedings on this occasion, and of those at the laying of the corner stone, has been published by Mr. G. H. Mathews, of New York, only a small number being printed. It is excellently got up, and a credit to all concerned.

† See p. 29.

in the white marble archivolt, just seen in the engraving, are filled with a flower each—the flowers being all different. The coupled arches over the door and windows of this story, in the Fourth-avenue front, are constructed of alternate voussoirs of blue-stone and gray marble. The clustered columns that support these are of gray marble, but the carved capitals and bases are of white marble.

The sculptured capitals throughout are of a very ornamental character, reminding us of some of the best works of the kind in this country. The three illustrations given are selected, in Fig. 1 from the Fourth-avenue side of the building, and in Figs. 2 and 3 from the entrance in Twenty-three-street. In Fig. 1, as well as in the right-hand capital of Fig. 3, is carved the well-known Virginian creeper—*Ampelopsis hederacea*; the former apparently mingled with some species of pitcher plant, and the latter with the Iris-like "day lily." In the left-hand capital of Fig. 3 is the exotic garden-rose and the *rhododendron*; whilst in Fig. 3, it is easy to detect, on the left, the noble garden-lily, *lilium candidum*, and a small *narcissus*; and in the right-hand capital the *azalea*, with another plant probably belonging to the same natural order.

The carving in the spandrels, and on the capitals of the drinking-fountain, is particularly good and appropriate, though too small to be seen in our view. In the spandrels are reeds, lilies, and *arums* or *caladiums*, the large green leaves of which so beautifully spotted with brilliant red, so many will long remember as displayed at the Horticultural Congress in May last. In the capitals are ferns and other plants appropriate to the situation, and (as throughout the rest of the building) mostly of American origin.

The wall of the next story is of white Westchester county marble, with bands and alternate voussoirs of blue-stone. The shafts in the angles of the windows are of the same gray marble as that of which the walls of the lower story are built. The capitals of these columns are of white marble, carved with designs composed of leaves of forest trees. The tympana of these windows are of white marble, pierced with foliated openings, after the fashion of plate tracery. In the spandrels of the arches of these windows, on the Fourth-avenue side, are open circles which show the brickwork of the wall. It is intended to fill these, at some future time, with medallion portraits of white marble. The irregular spaces about these circles and the spandrels of the arches on the Twenty-third-street front are to be filled with mosaic of coloured marble or tile. There are spaces to be decorated in the same manner in the great gable over the main door. But the principal needs of the building, as it stands, are, at other points, also near the main doorway. The two great buttresses which flank the entrance and the gable are, for the present, finished with caps; but they are designed for statues whenever such may be presented, or can be bought. The tympanum under the arch of the great door is to be filled with a mosaic, if possible, representing some subject or scene in the history of art.

Of the walls of the upper story, it is only necessary to say that the materials are white and grey marble. The cornice is wholly of white marble, but under each little arch is a square of coloured tiles. The cost of the building was about 150,000 dollars.

We may add that the National Academy of Design, when it was instituted, January 18th, 1826, consisted of the following members:—Samuel F. B. Morse, Henry Inman,* Thomas Cole,* Rembrandt Peale,* William Dunlap,* A. B. Durand, Charles C. Ingham,* Thomas S. Cummings, Frederick S. Agate,* John Evers, Edward C. Potter,* Hugh Reniagle,* John L. Morton, James Coyle,* D. W. Wilson,* John W. Paradise,* Nathaniel Rogers,* J. Parisien,* John Frazee,* Mosley J. Danforth, Chas. C. Wright,* William Main,* Peter Maverick,* Martin E. Thompson, and Ithiel Town.* It was chartered April the 5th, 1828. The number of works of art exhibited in the first year, 1826, was 170; the number in 1865, 647. The Academicians appear now to be 78 in number, and there are 78 associates.

One of the local chroniclers of the inauguration meeting says at the close of his notice,—"Our hope took shape. Beauty, art, culture, shall yet be ours, shall yet love America." We earnestly echo the aspiration, and fully coincide in the belief.

* Deceased.

"NO THOROUGHFARE."

THE Geysers of Iceland have long ranked among the wonders of the world. It is not alone as perennial fountains of hot water that they have excited the attention of the traveller. We have hot springs in this country; and the baths and gold-fish pools of Matlock are fed from an incessant and babbling spring, which, when an Icelandic atmosphere surrounds it, gives visible proof of its high temperature in clouds of vapour. But the peculiarity in the Geysers which strikes the imagination even more than the contrast between the boiling spring and the surrounding winter, is the intermittent nature of the flow. A jet of hot water, springing boldly from the surface of its own little crater-like pool, becomes by degrees feebler and feebler, and at last altogether ceases to rise. The orifice appears to be closed, and the communication with the hidden fires is for the time entirely cut off. After an interval, however, of longer or shorter duration, the explosive force of the subterranean steam has accumulated to a pressure that overcomes the temporary obstacle, the escape-pipe is cleared with a burst, and the full column of the Geyser again springs high into the air.

Not a few of our public affairs in England seem to be conducted on the principle of the Geyser. All the conservative elements in the national character, and we have plenty of these elements, respectable and disreputable, tend to form a deposit that chokes the channels of activity, and throttles the efforts made for improvement. Men who labour without pay in the service of their fellows lose heart by degrees in face of the constant dead weight of obstruction with which they have to contend. Old habits become more inveterate, and more intolerant, by virtue of their very age. Official routine gradually becomes stereotyped, and red tape is triumphant. At last the block becomes so palpable and so unendurable, that the impatience of the country is raised to an overpowering tension, public indignation explodes, and the obstructive nuisance, or the obstructives who have carefully built it up, are blown suddenly away. In the Geysers, the process is one of constant repetition,—we hope that the parallel may not be absolutely true.

Not a year, we might say not a month, passes without affording an illustration of this method of conducting public affairs. We have just had an instance on a scale of imposing magnitude. On the second day of 1867, the inhabitants of London awoke in a new world. Those who are fortunate enough not to have their rising on dark mornings absolutely regulated by the clock, were surprised to find how late it was when they awoke, and how unusually disinclined they felt to get out of bed. Those who rose early soon had reason to consider whether it was not the part of wisdom, as well as of comfort, to return to their warm beds. It did not seem as if they would do much good elsewhere. That which so often occurs in individual streets, with a frequency that seems to mark it for an especial amusement of the authorities, had taken place all over London,—a gigantic "No thoroughfare" had been everywhere exhibited, by no less a power than that of our old friend, Jack Frost. The *impasse* was complete. Railway-trains came slowly to a standstill in some deep cutting, and steam refused to move the driving-wheels. From New-cross to London became a distance of three hours' journey. Omnibuses simply had disappeared. Cabs were not to be found, until, later in the day, they were to be discovered in the new form of tandems. The architecture of the streets assumed a novel and imposing aspect, from the massive shade given to the string-courses by heavy coverings of snow. The clocks denoted contradictory hours, or were altogether veiled in white. The statues which so remarkably adorn London had assumed robes more majestic than their usual attire, and King George III. wore the same flowing full-bottomed wig with which, Mr. Jesse tells us, his Majesty so much horrified his beholders on a great official solemnity. Sir John Franklin alone, among these ghostly denizens of the metropolis, looked in his natural element. London seemed in the course of forty-eight hours to have been shifted to the latitude of St. Petersburg.

This was all very well for a time; but the snow-fall ceased, and the obstruction to our traffic continued. Men sought to go about their business, and there were no paths by which they could do so. Business had to remain undone. The daily papers became full of the complaints of correspondents, loud in their denunciations of those who let matters take their course, or rather made no effort to prevent the evil of there being no course to take. Day succeeded day, and nothing was done; or, in some cases, worse than nothing. And as public inconvenience gave rise to public indignation, and the vestries, who are supposed to have control over the communications of the various districts into which London is inconveniently and absurdly divided, became the objects of uncomplimentary remark. An officer and champion of one of these governing bodies came forward to assure the public that nothing would, or could, or should be done when it happened to snow. Unfortunately for the value of his opinion, this gentleman committed himself to figures. He told us that it would require 1,500 carts and 3,000 horses to remove 3,000 loads of snow from Regent-street. We can only say that if such be the estimate formed by a surveyor of the capabilities of the plant and stock of a contractor, the work of the latter under his orders must be most enviably lucrative.

We confess that we regard this great stoppage, unprecedented as it is in its magnitude, as a hopeful symptom. It cannot be called the straw that has broken the camel's back, for it has been a load ample to overpower many caravans. Its completeness, its persistency, and the manner in which it has brought into relief not only the helpnessness of the local Boards, but the unblushing complacency with which they regard their helplessness, and even seek to justify it, is enough, we would fain hope, to raise the public indignation to a pitch that shall blow away the vestries (not the vestrymen) to keep company with last year's snow. No event could have occurred better calculated to strengthen the hands of Lord Ebury, and those of his fellow-labourers, who are anxious to provide a better local government for the metropolis. Men who are unfit to deal with an emergency that is rather in accordance with, than an exception to, the ordinary laws of climatology, should not be allowed to muddle away the time, the convenience, and the money of their fellow-citizens. Worse alarms at times occur than those caused by a snow-storm, and where should we be then? We have been content to regard the Great Fire of 1666 as the last great fire possible in London. Is it so? Although our roofs are no longer thatched, how much is there of combustible matter stored in the materials and furniture of our houses? If, as we have but too unfortunately seen, our principal waterworks are allowed to catch fire; if the reservoirs of the great fountains of the Crystal Palace were allowed to be unavailable on the only occasion on which there has been a real necessity for their use, who shall sleep secure in a city which for a week has been left impervious to the engines of the fire brigade? What would be our condition if an earthquake, such as has just devastated Algeria, and of the possible visitation of which we have not been without significant hints, should suddenly shake St. Paul's. It is the part of wise citizens to read the lesson set us by the blockade of the 2nd of January as one of timely and salutary warning; and, if we fail to do so, we may be sure that worse will come of it.

It ought to be a rule with all great public, and even great private, establishments, to have an alarm given at periods of sufficiently frequent recurrence, to ensure sufficient action in the hour of real need. How such an obvious precaution could have been neglected at the Crystal Palace is matter of wonder—or rather would be matter of wonder if precaution were not with us the exception rather than the rule. By the employment of this slight touch of the quarter-deck, plants and animals, sparkling Alhambra Court, noble tree-ferns, gorgeous parrots, and all the rich tribute of nature and of art, which have been accumulating for more than ten years at Sydenham, would now have been unharmed. We beg to urge most emphatically on the authorities at our great museums the necessity of this rule. There are buckets visible enough at South Kensington. Is there any water to fill them?—any one who knows the way to the supply?—any one to give orders?—any practical, efficient, organized system to be adopted, and that on the instant, in case of an alarm of fire being given at that storehouse of such rich treasures? We hope to hear that an alarm of fire is given there within a week. It is the only way to be secure against what often gives no alarm, till too late,—the actual outbreak of fire.

What, too, are the precautions adopted at the National Gallery?

The subject is one for the attention of the insurance companies. It ought to be insisted on in the policies of all heavy insurances. It is universal for the owners of valuable and combustible property to insure for its amount, and then to leave all but the very simplest precautions at the risk of the under-writers. No office ought to insure such a building as the Kensington Museum or the Crystal Palace, either wholly or in part, without providing for the instant applicablity of the resources of the establishment in case of the outbreak of fire.

Twice within the week have we had a warning. What shall we deserve if we pay no heed? The waste of available power, the absence of the right thing at the right time, the helpless blaze of the Crystal Palace, around the very bases of the great water-towers, might have been warning enough. But there are men too busy to read the newspapers—men whose golden minutes are too profitably occupied, or whose precious eyesight is too severely taxed, to allow of the relaxation,—men whose daily thoughts are limited by the walls of their place of business. So the hint has come to them, so loud that they could not fail to hear, so unpleasant that they can not readily forget. There is not a single inhabitant of London to whom the first week of 1867 has not brought positive proof that things are not so ordered as they should be in the great city in which he dwells. If, after such a warning, we fail to set our houses in order, it is in accordance with all that we know of human history to expect that we shall have cause bitterly to rue our neglect.*

THE DESIGNS FOR THE NEW NATIONAL GALLERY.

FOR thirty years nearly, or ever since its completion in 1838, the building that has occupied what we have become tired of hearing described, in Sir Robert Peel's words, as "the finest site in Europe," has been the *best abused* building in Europe. Getting somehow, at once, and even more from causes now undeterminable, than from those which are obvious, a *bad name*,—that "worst of woes that wait" on the reputation of a building as on that of a man,—it soon became the favourite example for quotation by the art-critics of the newspapers; who are never so happy as when they are demonstrating the utter inferiority of architectural work that is accomplished, to the standard which the reader is to suppose them acquainted with. Generally, we think, in no subject handled by what is called the public press is such inferiority of treatment shown as in the subject of architecture; and the worst part of the matter is that neither is the ignorance confessed, nor are the pains taken which might speedily produce qualifications for effecting some amount of good: on the contrary, condemnation is taken as the tone, because of the unlearned or unthinking writers' incapacity for such pleasurable appreciation as it has been lately said, and not ill said, is the proper office of criticism. Simple blame is more easy of expression than judicious estimation of the right and the relative wrong; and the former has this advantage to the ordinary self-constituted judge, that it gains him with the public to whom he addresses himself, the reputation of superior knowledge. Observations similar to these which we have just made, may have been made before; but we offer them here because they are immediately suggested by the recollection of what has appeared in connexion with the subject of the building in Trafalgar-square, and by what is at present appearing with reference to the designs for the new or modified building.

These designs, sent in competition by ten architects, are now on view, or on the last four days of each week, in the Royal Gallery of the Palace at Westminster, and have already been noticed in the daily papers, and, we might say, adjudicated upon, with a facility and a conclusiveness which we are unable to emulate. It is essential to recollect what the problem set before the competitors really is, or was. The solution of such problem is not necessarily started in the production of even the most carefully-executed set of drawings; and the particular probelm includes not alone the doing justice to the "finest site," &c., but also the provision of suitable quarters for the national pictures. It is a problem, too, that is by no means free from difficulty as to the site; and is one that, as presented to the competitors, was not exactly definite: since there are two, or even three, problems, rather than one, of which the collateral solution was asked by the late Government.

We could not be satisfied to give this week much more than a general notice of the competition and drawings. We must defer particulars of the majority of the designs; although the rapidity with which non-professional judges, and even professional, get through their work, may make us in arrear.

The architects who have sent designs are Messrs. Owen Jones, C. Brodrick, G. E. Street, F. P. Cockerell, J. Murray, E. M. Barry, F. C. Penrose, G. S. Clarke, M. D. Wyatt, and Banks & Barry. Of these ten, each one has sent in two designs as required by the instructions; and the greater number of the ten have sent, in addition, one or more variations of their main design. Consequently there may be about thirty designs, in fact, for the consideration of the judges. The drawings altogether not being numerous, it has been possible to arrange them in the Royal Gallery much better than competition-drawings are arranged usually. Besides the walls at the sides of the Gallery, for a portion of the length, and similar space at one end, there is a screen down the middle of the Gallery: thus there has been no necessity to place drawings so much above the eye as to preclude examination of them,—excepting with the help of steps or ladders,—contrivances such as were required on the last occasion, but were not made use of. The Royal Gallery is however an unsuitable place, at this time of the year, for exhibition of any number of architectural drawings. At two o'clock in the afternoon, this week, the light has been quite inadequate. Amongst the sets of drawings, remarkable for number of the drawings, as well the execution of them, are those contributed by Messrs. Cockerell, Murray, Clarke, and Wyatt. Mr. Murray's drawings are on twenty-seven straining-frames: Mr. Wyatt's are on twenty-four; Mr. Cockerell's on twenty-two; and Mr. Clarke's on twenty-one. Mr. Cockerell's drawings are perhaps the most skilfully executed; though several others, as Mr. Wyatt's, are almost equally good, whilst very different in general appearance. Our non-professional readers are requested to bear in mind that good drawing may or may not be associated with good design. Architects should not require to be reminded of the distinction that there is: though, we are obliged to say, they are more impressionable by good drawing, even than the public. As regards the uses of the building, nearly all the designs seem to be the result of careful study of the requirements; albeit the gallery of the Sheepshanks Collection, at South Kensington, having been mentioned to the competitors in a letter from the Office of the Works, when a description of it was furnished, the usual consequences of such references in instructions may have accrued, in many of the designs, in the omission of a certain exercise of judgment.

The original "Circular to Competing Architects," with the "Instructions to Architects," was sent from the Office of Works on the 15th of February, 1866. It will be recollected that, before this, the question of site had been for many years under discussion. Different quarters of the metropolis, including one or other of the parks, and Kensington Gardens, and most recently the Burlington House site, had been named. Also under discussion had been the South Kensington estate, or part of it, that is to say, the locality in which the pictures of the Sheepshanks collection were; and where the whole of the modern pictures, including what were in Trafalgar-square, are at present, as well as the cartoons removed from Hampton Court. Somewhere about 1851, there was a proposal to appropriate Buckingham Palace to the purposes of the National Gallery. In that case, the present building in Trafalgar-square would have been given up to the Royal Academy; and a Royal Palace would have been placed in Kensington Gardens. The project in connexion with the Burlington House site was at one time so far advanced, that a design had been made by Messrs. Banks & Barry. In this design, the limitation of the galleries, or exhibition-space, in fact the building generally, to one story, combined with appropriation of the whole ground, or without courts, was the characteristic. It was considered that taking into account both light and wall-surface, more was obtainable by the arrangement here referred to than by that of galleries in two stories. We may mention that Messrs. Banks & Barry's present design, or for the Trafalgar-square site, much resembles the previous one for the different site. Our allusion to the question of multiplication of stories *versus* appropriation of the ground that would have been given to courts, may help the public to the reasons of differences between the ground-plans of designs, as to space left for lighting; which differences, certainly, are at first very remarkable.

The decision in favour of the Trafalgar-square site, with additions, being considered final, it only remained that the boundaries of the ground to be taken, should be settled, along with the question as to the existing building, of which the eastern portion is to be vacated by the Royal Academy. The new ground, since acquired or about to be, is bounded on the east by St. Martin's-place, on the north by Hemming's-row, and on the west by Castle-street, or rather by the wall of the barrack-yard. This area is now occupied by the workhouse, by different premises at the east (which include one house occupied by several literary and scientific societies, a savings-bank, a house let as offices, and a shop), and by Archbishop Tenison's Library at the west. The present passage along the back of the National Gallery, or Royal Academy, would be absorbed. Besides the immediate appropriation of the area described, the competitors were to be at liberty to contemplate the western extension of the buildings in the rear, as a measure for the future, that is utilizing in some way ground now belonging to the barracks. The "Instructions" say: buildings "hereafter erected over the barrack-yard." Nearly all the competitors have understood this as involving, or allowing of, the entire removal of the barracks; and some of them show a street from Pall Mall East, in which there would be a western frontage to the building as they propose that it should be eventually. Much was said at one time about building a portion of the addition to the Gallery on iron columns over the barrack-yard; but whatever may have been intended by those who framed the "Instructions," the competitors are right as to the thing desirable: any arrangement of a building on columns would be most objectionable; whilst the new street at the west is much wanted. The new ground is by no means rectangular; and the eastern end of the entire site is very irregular. Hemming's-row, with its prolongation, and the line of frontage of the present building, are not parallel: the line of the new street, of some of the competitors, at the west, would be considerably longer than the distance is of the east end of Hemming's-row from Trafalgar-square. As regards the eastern boundary, it will be recollected that the houses in St. Martin's-place, up to Hemming's-row, are considerably in advance of the end of the present building of the National Gallery. None of the competitors have thought fit to sacrifice the eastward projecting piece, or to give it up to the street: though for the latter course there might have been arguments. Most of the competitors place here an apsidal projection from the main block.

The "Instructions" required designs under two alternatives, preparatory to a decision on the best mode of laying out the new site, and on the question of "retaining the existing building," or "reconstructing or remodelling it." By the first alternative, buildings would be erected on the site already described; and these would communicate with the existing building; wherein no costly alterations would be made. By the second alternative, the work would include the demolition and construction, or the remodelling, of the existing building. The Trafalgar-square front was "to be arranged so as not to obscure the view of the portico of St. Martin's Church from Pall-mall East, or from any part of Trafalgar-square." This stipulation, as worded, seems to have occasioned difficulty to some of the competitors. It will be recollected that the similar injunction laid upon Wilkins, was the cause of that setting-back of the ends of the building, which has been attended by a reduction of the accommodation, whilst it has *contributed* to architectural effect,—as it certainly has even in the National Gallery building itself. But Wilkins made the portico projecting considerably: on the other hand, he sacrificed one of the finest features of a portico, steps in front,—so well displayed in his other work, the London University College. The entrance to the building the "Instructions" said, was to be as at present

* The destruction of Croydon Church, consumed while the fire-engines were deluged by the snow, forms an emphatic comment on our warning.

but there were to be exits into St. Martin's-place and Hemming's-row. There was to be a residence for the keeper, and one for the porter. The largest possible extent of wall-space for hanging pictures was to be obtained, so far as "consistent with grand architectural effects." Top-lighting was preferred; but side-lighting was made admissible for cabinet-pictures and original drawings. A width of 50 ft. was prescribed for the largest galleries, because, as the "Instructions" said, ample floor-space was needed for the accommodation of the multitude thronging the galleries. Thorough and easy ventilation, warming by hot-water pipes, "fireproof construction," and tanks of water on the roof were also mentioned. Each architect was to be paid 200*l.* for his drawings and statements; which were to become the property of the Commissioners of Works. The First Commissioner did not engage to adopt any of the designs; but if one of the designs were adopted, the author of it would be employed to carry it into effect, being paid "the usual commission of 5 per cent. on the outlay," inclusive of all expenses of measuring.

Several of the competitors had gone to work when, on the 29th June, the competitors received a copy of a reply by Mr. Wornum to a letter addressed to him from the Office of Works, requiring information as to the accommodation that should be provided for receiving, storing, and cleaning pictures. The reply gives, under twenty-seven heads, the designations of rooms and particulars of accommodation that would be required in connexion with the business of the establishment. The plain judicious course would have been to apply to Mr. Wornum before the issue of the original instructions.

In the letter of the 29th June, it is stated that "the committee of judges" to "be appointed to decide upon the plans" would "include within its members not less than two professional architects." The time originally named for sending in the plans was three months from the 15th February, 1866; but the 31st October was afterwards named, and afterwards the 1st January of this year.

There are merits in the present building of the National Gallery; although there has been general agreement amongst the public as to certain defects. The lowness, the central dome, and the terminations stigmatized as "pepper-boxes," have had no defenders; and they should not have. Features of the building also defective, but less frequently mentioned, are the blank-looking podium-wall carrying the columns, the somewhat too low pitch of the pediment, and the side-porticoes without semblance of utility. In addition to these features of the building itself, those of Trafalgar-square, as designed and carried into effect by Sir Charles Barry, have often been objected to. In nearly all the designs retaining the present front, each of the features of the building itself, which have been named, is got rid of; and in several of them the retaining-wall and balustrade of the terrace-road is either omitted, or greatly modified. The Square was indeed not one of Barry's best works. A flight of steps in the centre has sometimes been referred to as what should have been provided. Some of the competitors have introduced this feature; and at least one design, Mr. Brodrick's, does away with the wall and balustrade entirely, and substitutes a flight of steps occupying the whole width between the pedestal of the statue of George IV., and the corresponding pedestal. The dome and "pepper-boxes" of the building are got rid of in the designs generally; and a larger dome, or other more commanding feature than the present one, in the centre, is substituted: the building is heightened, as by the addition of an attic: the podium-wall is rusticated, or otherwise decorated; or the portico is entirely altered, so as to admit of steps; and the wings are improved, as by the connexion of the side-porticoes, by columns, with the central portico. The staircase-hall, adapted in size to a larger building than the present one, is made to revert to the arrangement that it had as left by Wilkins, with the opposite flights of stairs, but with inserted columns in the ground-story.

In the plan of the upper floor, the present rooms of the western half of the building, and the exhibition-rooms of the Academy, considered by Mr. Wornum to be very good rooms for their purpose, are generally retained: this is the case even in designs that modify the building considerably. Where new galleries are designed for the larger pictures, the prescribed width, 50 ft., has been adhered to: but this width is greater than necessary; and such is the view taken by many of the competitors, and by Mr. Wornum also. Wall-space is the first consideration. The galleries for cabinet-pictures, generally side-lighted, are of course narrower than 50 ft.; and some designs provide two stories of these galleries in the height of one story of the principal galleries. One disadvantage of great width is that it requires corresponding, that is unnecessary, height. It used to be objected to the present rooms of the National Gallery, that pictures of the largest dimensions, like some of those of the Venetian School, could not be hung in them; but the truth is that such pictures would so seldom be obtainable, that it could not be desirable to arrange every room as in preparation for them: one room would be quite sufficient. Mr. Street's design is Gothic; and so is one of the designs submitted by Mr. Somers Clarke. Mr. Wyatt's design is remarkable for a peculiarity of the arrangement for *top*-lighting the ground-story, as also remarkable for both elaboration and novelty in the decorative design, including details. But we will at present express no judgment on comparative merits of the designs, and suitableness for selection. Previously to judgment, facts of designs must have been got at from the drawings; and some of these data we have yet to collect. But, next week, we will give further particulars of the designs.

The judges appointed to adjudicate on the designs are,—Viscount Hardinge; Lord Elcho, M.P.; Mr. A. J. B. Beresford-Hope, M.P., president of the Royal Institute of British Architects; Mr. W. Tite, M.P.; Mr. W. Russell, trustee of the National Gallery; Mr. W. Boxall, R.A., director of the National Gallery; Mr. David Brandon, architect; Mr. T. Gambier Parry; and Mr. R. Redgrave, R.A., inspector-general, Science and Art Department.

THE COST OF LONDON MUD.

THE city of Turin deservedly attracts the admiration of the tourist. We rejoice that the steady progress of the great Mont Cenis Tunnel bids fair to remove, within a reasonable time, the chief obstacle to visiting the sub-Alpine capital. Our architects and engineers, and all those interested in the improvement and in the comfort of London, might draw from the example of a city which might, for its size, be lost in one of the great outlying districts of the English metropolis, unseen and unknown to many who pass three hundred days out of the year in the City precincts, a lesson to which we now take leave to refer.

We are not about to describe the broad streets and steady boulevards of the gallant little city, or to dwell on the noble panoramic view that rewards the ascent of the hill which commands the full current of the Po. With the exception of a very small portion, the most ancient part, of the town, the perfect symmetry and regularity of the plan gives a high idea of the organizing habits of the builders. The palace of the Dukes of Savoy, now a royal Italian residence, looks straight through the main street of the city down a vista closed by the rival structure of the railway station, as if the genii of the past and of the present, the ghosts of *Tête de Fer* and of Robert Stephenson, the embodied expressions of feudalism and of steam power, were resting on their arms in presence of each other. We are not about to dwell on the efficient and unpretending military defences of the place, on the revetted moat that protects the City from a *coup de main*, and on the manner in which the communications of the place are so contrived as to be free, open, and convenient, and yet capable of immediate closing is case of need. But the point to which we now wish to call attention is this. People can walk about in Turin all the year round without ruining their boots or their skirts. Violent thunder-storms from the Alps burst at times over the city with a force that converts every street, for a few minutes, into a stream, and covers the pavement with an inch or two of water. But half an hour after the rainfall has ceased its traces have disappeared, and patent leather boots or satin shoes can trip from the Station to the Palace, and from the Palace to the bridge over the Po, with less damage than would attend the passage of a single crossing in Regent-street, or of ten yards' distance from any of our metropolitan termini on half the days in the year.

It is obvious that it is more easy to clear the ways of a city that includes a population intermediate between that of Bristol and that of Leeds than of one sixteen times its size. But the very reference to the names of those smaller English cities that occur as illustrative of the size of Turin will convince us that the question is not one of size alone. The three quarters of a million passengers who daily enter the City of London constitute a traffic marked by peculiar features, and neither chemistry nor chance has produced elsewhere a substance that could be mistaken for London mud when the streets are what is appropriately called "greasy." But the neglect and the filth of the London streets are not wholly due to the magnitude of the traffic. Pimlico is as dirty as the Strand; Bayswater is little or no better than Newgate-street. Without disrespect to Bristol or to Leeds, without even asserting a bad pre-eminence over those towns, we may well call London signally and abominably dirty, neglected, and uncared for, as regards the comfort of the pedestrian.

Who and how many are the pedestrians who tread the streets of London we have recently seen. What a wet day costs them (and we have 157 wet days per annum in London), it is not so easy to reckon. If we say that three millions sterling are spent every year in shoeing the London population, we shall probably be far within the mark. If we estimate that to plunge daily through muddy streets, especially for those pedestrians who have not a sufficient number of pairs of walking-shoes to allow the wet ones to be slowly and thoroughly dried, will shorten the duration of two-thirds of these articles by 25 per cent., we shall, no doubt, have the assent of unfortunate experience. That would give us a waste in shoe-leather alone of half a million sterling a year, in consequence of muddy streets. The tailors of London amount to only two-thirds of the number of the shoemakers. The outlay incurred in clothing men's legs in trowsers, will be only a fourth or a fifth of our tailors' bills. But then comes the question, of skirts. A hundred and twenty thousand women enter the City daily, of whom ninety thousand walk. That is for the City alone. Over the whole metropolis we cannot reckon that less than three-fourths of a million of skirts daily perform, inefficiently, it is true, but still at a ruinous expense, the duties of the scavenger. With the exception of the comparatively few ladies who drive in their own carriages—and even they can hardly be at all times altogether exempt—the whole female population of London is subjected to a tax of which we will not venture to estimate the amount, by the neglect of the streets. Who would contract to make good the unnecessary destruction of garments of all kinds by the mud of London for a million sterling per annum? If we add the cost of additional washing, of the hire of vehicles, of the wear and tear of vehicles and of horses, and of medical services rendered necessary in consequence of colds and worse disorders caught from wet feet, we shall find that a very large annual sum, not easily calculated, but amounting, at all events, to seven places of figures, is annually wasted by the residents of London in consequence of the neglected state of the streets.

If such be the cost of our London mud, the question naturally suggests itself, why should not the mud be removed or prevented? Would the cost of an efficient system of street-cleaning approach that incurred by street-neglect, to say nothing of the contributions exacted by the volunteer corps of crossing-sweepers?

Why should English people, who are wont to pride themselves on their personal cleanliness, suffer their streets to remain in a state that would be found intolerable in continental cities? Why should London, and Bristol, and Leeds be worse for the pedestrian than Paris, or Turin, or lazzarone-haunted Naples?

The question is not one to be answered by a simple recommendation to sweep the streets more frequently. We must consider the difference in the arrangements for the sewage, as well as for the scavenging, of English and of Continental towns; and we must inquire how our roads are made and maintained, before we can reply to the inquiry how they are to be cleansed.

The first difference to be considered is that which relates to sewage. In London, the main object of the large cost incurred in the construction of the sewers is the self-acting purification of the dwellings. The cesspools common in Paris are, very properly, not permitted in London. The rainfall, it is true, makes the best of its way into the subterranean channels; but it is

considered important to prevent it from sweeping the mud of the streets in its course, as it does in Continental cities, and the attention that is given to secure the health and comfort of private dwellings forms an obstacle to the most natural mode of cleansing the streets.

On the other hand, we must bear in mind that the streets of most Continental cities afford to the inhabitants an accommodation rigidly denied to the Londoners, that, namely, of a dust-heap and dunghill;—that great part of the refuse of the houses is systematically thrown into the streets, and, after passing under the inspection of the members of the vagrant profession of *chiffoniers*, who live upon this humble prey, is carted away by scavengers paid for the purpose. If, then, more facility exists for removing purely liquid mud in Paris than in London, it must be borne in mind that in the latter city we have only to deal with the mud created by the wheels of vehicles and the feet of horses, and with the natural consequences of a large vehicular traffic.

Prevention is better than cure. Before we inquire how best to get rid of our mud, it is well to ask whether we cannot avoid making so much. For it is a costly product. The water that goes to form it, indeed, we get for nothing; but the solid mineral constituent has been brought to our roads at a considerable expense, broken by hand labour, and comminuted by a more costly machinery than we have yet constructed for crushing Californian quartz. Before our mud is removed from our streets it has cost us pretty nearly as much per ton as the coal which we burn in our grates.

The selection of the material for pitching as well as for metalling the streets of London appears to have been made on mechanical grounds alone, without reference to the no less important question of chemical constitution. The granite which floors so much of the carriage-way has a structure that resists attrition in a considerable degree, and that is also capable of being worked by the pick into regular form. For curb-stones to keep the foot-paving in place, and to ward off the occasional inroad of a carriage-wheel, granite is well adapted. But when the constant friction of heavy traffic grinds the surface into powder, whether in pitched or in macadamised roads, the felspar which forms a main constituent of the rock, is decomposed, and the mineral which, geologically speaking, is the mother of clay, gives forth an aluminous mud. Our roads may almost as well be coated with London clay itself as with powdered granite, and this, mingled with horse-dung and with soot, forms our peculiar mud. The flinty pebbles used in the formation of some of our quieter streets, may be more readily powdered than the granite or limestone; but the difference in cleanliness and in facility of drying between a felspathic or a calcareous and a flint road may be any day observed by passing from the inner to the outer circle of the Regent's Park, or from the Portsdown-road to the Edgeware-road. The mere substitution of a siliceous stone for that at present used in the macadamised streets, would be a most important gain to the cleanliness of London.

Two thousand years ago cities were founded; now they spring up unawares. In old times they were designed, now they seem to agglomerate by chance. The Cloaca Maxima of Rome dates from the 150th year of the city; the main-drainage system of London was constructed eight centuries after the Norman Conqueror gave a charter to the capital of his new dominions. From Rome to her great Neapolitan port, the Via Appia, yet to be traced, was solidly constructed of blocks of lava 18 inches square. From London to Westminster, to Kensington, to Highgate, no record exists to show that any road was ever constructed at all. Bit by bit the original cattle-paths and foot-tracks have been gravelled, widened, occasionally straightened, partially paved, inconveniently macadamised, and so on; but at no time in our history has the question of metropolitan road-making been thoroughly investigated and resolutely grappled with. It was the chance observation of a country magistrate that led to the adoption, within the memory of man, of that great improvement of our former country-roads that is known by the name of Macadam. Without more ado, the macadamised turnpike-road has been adopted for the greater part of the street-communication of our cities, and inconveniences that are tolerable for long lines of rural highway, where traffic is sparse and where it is a question of the cost per yard of maintenance whether you can have any road at all, have been accepted as unavoidable under the very opposite conditions of our city streets. A shilling per yard, 88*l.* per mile, from London to Holyhead, was a matter of great importance. As referring to the paving of Oxford-street, such an item has only an infinitesimal value. Can we do no better than transplant a fair make-shift country-road into the heart of our great cities? It is strange that the question should need putting at this time.

Not, absolutely, for the first time, for private enterprise has brought forward several attempts at patented improvements, without a larger success, however, than might have been predicted for the effort. We have been fated to slip and slide over wood, and to grind over iron, always coming back to our mud. One point we must for the present take as settled, and that is that setts, or small solid blocks of stone, when laid on a carefully-prepared bed, afford the most convenient support to the enormous traffic of these main highways with which we are as yet acquainted. A pavement of this kind has many defects: it is noisy and liable to displacement, but it forms less mud than other roads, and it can readily be repaired and kept clean. It affords foothold to horses, and it supports heavy weights. The extension of solid paving along more of the main lines of traffic is highly to be desired.

For streets of the second order, streets which, while forming no part of the main through-system of east and west or north and south communication, yet accommodate a large traffic, we should most strongly advise the adoption, at least experimentally, of one of two systems common in Italy. Large square blocks, like those of the Via Appia, and those with which Naples is paved, might be adopted with equal advantage in London; or long, broad paving blocks for the wheels, with the intermediate spaces pitched with setts, would not be less available in London than in Turin. The successful application of either of these methods to streets of a secondary traffic would be an immense improvement.

For streets of the third class, where the traffic is light and rare, a solid stone pavement is not absolutely requisite. But none the less carefully should such streets be guarded from becoming fountains of mud. The duty of pulverising and rolling the road metal should no longer be performed by the most expensive and the least efficient instruments, namely, the wheels of carriages built on springs. The roadway should be carefully laid with properly-broken stone of a purely siliceous nature, the interstices filled in with a sharp grit, cemented by the use of hydraulic lime, and consolidated by a steam roller, before any vehicles are allowed to pass. Thus constructed the durability and cleanliness of the quieter streets would be great, and the entire metropolitan system of roads would be in a condition to form the minimum quantity of mud, and thus to present the most favourable area for the operations of the scavenger.

We may add, that the best roads in England are some in the neighbourhood of Bromsgrove, which are formed from the primitive siliceous rocks of the Lickey Hill. Whether this rock is capable of being quarried in blocks fit for paving we are uninformed; if so, no stone could equal it for the purpose. For the concrete or macadamized surface of unpaved roads we have never seen any material, in any part of the world, to compare with that laid on the roads round the Lickey, and the employment of this stone for our London streets, if once tried, would never be abandoned.

We cannot just now examine the question of cleansing. We can only add, that in the effort that is being made to secure a rational system of municipal government for the home of a sixth part of the population of England, we see a hope and a promise that it will not be always a pure waste of time to offer such observations as the above, but that we may hereafter meet with a set of men who will not only take an enlightened interest in the physical welfare of their fellow citizens, but be able to give effect to that interest;—a governing body who first will be anxious to ascertain what is best to be done, apart from fear and from favour, and who, having arrived at the conclusion, will then GO AND DO IT.

THE SHROPSHIRE COUNTY SURVEYORSHIP.—At the general quarter sessions of Shropshire, Mr. Thomas Groves, jun., has been appointed to the office of surveyor for the county, in the room of Mr. Edward Haycock, resigned.

CROYDON CHURCH.

LAST week's calamitous and always-to-be-regretted fire at the fine old, almost archi-episcopal, parish church of Croydon, in Surrey, will give satisfaction alone to one person—the lucky architect who is likely to get the task, not of restoring, but of *replacing* it. Two facts connected with English art deserve special note: one is not mentioned by those who have written about the church in this century, and the other has been overlooked in the Life of one of the very ablest of our Anglo-American artists.

The Croydon half-recumbent effigy-tomb of the famous Archbishop Sheldon, to whom Oxford, and all who speak the English language, owe Sir Christopher Wren's Sheldonian Theatre (still a wonder in a wood-roof ceiling), has been destroyed. It was of Italian marble, not of the purest, but good of its kind, and was the work of Latham, the City architect (temp. Charles II.) and Bonne, as Walpole tells us in his "Anecdotes of Art." What we have to add is very far indeed from being generally known.

The capital engraving of this statue to be found in the first volume of the Messrs. Lysons's "Environs of London" (*see* "Croydon"), was made, they tell us (vol. i., p. 183, ed. 4to, 1795), from "a beautiful drawing by Mr. Lawrence." This "Mr. Lawrence," we have to point out, was the future Sir Thomas, president of the Royal Academy of Arts in London, and something more. The *drawing* must have been exquisitely just and delicate.

John Singleton Copley, R.A., is the capital painter of two fine English historical pictures,—"The Death of the Great Lord Chatham," and "The Death of Major Peirson," bought (1864) at his son Lord Chancellor Lyndhurst's sale, for the nation, price 1,600*l.* Sir Charles Eastlake was the purchaser.

This unhappy fire at Croydon Church has told us where Copley lies buried. The fire revealed his grave,—an inscribed stone, and nothing more. This fact is not to be found even in that useful work, Britton & Brayley's "Surrey."

Many who visit the Church of St. John the Baptist, Croydon, will take special care to stand by the charred gravestone of a great historical painter, and the father—as well—of Lord Chancellor Lyndhurst.

Fire! thou hast been too much a master: witness the Houses of Parliament—the Tower of London—Doncaster Church—the Austin Friars' Church — the Savoy Church — the Crystal Palace — and, now — Archiepiscopal Croydon Church. Which of our national treasuries will fall next?

PRESERVATION OF WOOD IN DAMP AND WET SITUATIONS.*

No introductory apology for the theme of this paper is judged necessary. A few plain statements will show that the subject is one of vast though unheeded importance.

The annual drain which is exhausting our forests is startling when we remember the large areas of our country utterly destitute of timber—when we learn, for instance, that "upon the 55,000 square miles of Illinois, there grows not a single pine large enough from which to fashion a board.† Statistics show that, in 1865, above 5,000,000,000 feet of lumber, 2,000,000,000 of shingles, and 900,000,000 pieces of lath were sold in Chicago alone.‡ Michigan and Wisconsin almost entirely supply that market. 6,000 feet of pine lumber per acre is an average yield.§ No formal calculation is necessary to show us that, with the present demand, a single generation will exhaust the supply which those states can afford.

But the consumption increases in a rapid ratio. It has already raised the prices. Clear lumber sold for 18 dols. per thousand in 1855, for 24 dols. per thousand in 1860, and for 45 dols.

* The following paper, written by Mr. H. W. Lewis, University of Michigan, for the *Journal of the Franklin Institute*, gives useful references to information on an important subject scattered over the pages of the *Builder* and other journals.—ED.

† Hunt's *Merchant's Mag.*, Feb., 1866, page 105.

‡ Lumber, 5,089,033,033 ft.; shingles, 3,560,093,212; lath pieces, 938,297,743.—Hunt's *Merchant's Mag.*

§ "An average estimate of the product of lumber of all the pine lands in the State is 6,000 ft. to the acre. Some sections will overrun, some fall short, of this amount." * * * "Seven years will exhaust all the pine lumber within five miles of any of the navigable rivers."—*The Pine Lands and Lumber Trade of Michigan*, page 4.

per thousand in 1865.* And following close on Chicago, in this trade, are Albany and Pittsburgh.†

Improvidence will soon, we fear, make us as dependent on foreign supplies of timber as is England, who has already granted numerous patents for processes promoting the durability of the lumber every enlightened nation must have.

Shall we employ those processes whose utility experience has demonstrated? Self-interest returns but one answer. But in American railway management, self-interest seems to be disregarded. While the average life of English railway sleepers is fifteen years, that of American sleepers is only seven years.‡ Allowing 2,112 sleepers per mile, at 50 cents each,§ 1,056 dols. per mile of American railroad *decays* every seven years. Thoroughly impregnate those sleepers with sulphate of copper, at a cost of 5 cents each, and they would last twice as long. Thus would be effected a saving of 880 dols. per mile‖ in the seven years, on sleepers alone. In the United States are 33,908·6 miles of railroad.¶ The whole saving on these lines would be 29,839,568 dols., or upwards of 4,262,795 dols. per annum.

Again, English engineers deride American wooden railway bridges. Eight years is their average duration.** Creosote them and they are good for double or treble that time.†† For ordinary railroad purposes they cost 40 dols. per linear foot.‡‡ The use of Bethell's process would effect a great saving on such a line as the Grand Trunk Railway, whose wooden bridges measure 9,355 feet upon the Montreal and Portland division alone.§§ Further illustrations of the importance of preserving timber from decay seem unnecessary. Let us proceed to the discussion of this desirable object.

In situations so free from moisture that we may practically call them dry, the durability of timber is almost unlimited. The roof of Westminster Hall is more than 450 years old. In Stirling Castle are carvings in oak, well preserved, over 300 years of age. Scotch fir has been found in good condition after a known use of 300 years,‖‖ and the trusses of the roof of the basilica of St. Paul, Rome, were sound and good after 1,000 years of service.¶¶ After these well-attested examples of preservation, the further consideration of wood in this state seems unnecessary.

Wood constantly wet in fresh water is quite as durable. Piles were dug from the foundations of old Savoy Palace, in a perfectly sound state, after having been down 650 years. The piles of old London Bridge were found sound and perfect 800 years after they were driven.***

While the acidity of bog-water retards decay, it seems to us that part of the preservative property attributed to the stagnant liquid ††† should be ascribed to the salts of metals or alkaline earths held in solution, and deposited among the woody fibres.

In the above situations, the action of natural agents cannot be improved; but in certain other conditions, man must resort to preservative processes to secure permanence of structure. For convenience of discussion we have introduced the following classification:—

1. When wood is damp we have to guard against dry-rot.

2. When wood is alternately wet and dry we have to guard against wet-rot.

3. When wood is constantly wet in sea-water we have to guard against *Teredo navalis* and *Limnoria terebrans*.

1. *Wood in Damp Situations.*—When unseasoned wood is surrounded by dead air, it very rapidly decays, fine fungous growths extending through every part. After the rot has begun, the mere contact of decayed and sound wood seems sufficient to ensure, by a catalytic action, its spread through the latter. This has probably led some observers to their conclusions, that the accompanying parasitic plants, *Merulius lachrymans* (or *L. vastator*) and *Polyporus hydridus*, cause the decay. But the highest authorities now regard these growths as accessory, and beginning only after a suitable habitat has been prepared for them.* Thus the fungus acts the part of a scavenger and converts corrupt matter into new forms of life. The presence in the timber of the fungi spores is easily explained. The researches of Pasteur show that atmospheric dust is filled with minute germs of various species of animals and plants, ready to develop as soon as they fall into a congenial locality. He concludes that all fermentation is caused by the germination of such infinitesimal spores.† That they elude observation does not seem strange, when we consider that some infusoria are only $\frac{1}{2400}$ of an inch in length.‡ Admitting that they are only ten times the linear dimensions of their germs, the latter will be $\frac{1}{24000}$ of an inch long. But with the best microscopes we cannot perceive objects measuring less than $\frac{1}{4000}$ of an inch. These germs might find their way into the growing plant through both roots and leaves. The whole tree is thus filled with the seeds of decay, awaiting suitable conditions to spring into growing organisms. The prolonged vitality of spores, made necessary by this theory, cannot be a serious objection, when we remember the vigour of the "mummy wheat," and the unknown plants which start from the earth raised from deep excavations. Indeed, time, even when measured by centuries, seems hardly to affect the vitality of vegetable germs.

But what prepares timber for the germination of the fungi spores? Probably fermentation of the juices and semi-solids of the moist wood. For fermentation, five conditions are necessary,§ viz.:—1. Presence of water. 2. Temperature from 40° to 110° Fahr. 3. Presence of a ferment. 4. Presence of a fermentable body. 5. Exposure to the atmosphere.

Three of these conditions almost always prevail. Very rarely, if ever, can we maintain the temperature of any timber construction below 40° Fahr., or above 110° Fahr. Probably countless numbers of ferment spores are annually absorbed into the fluids of the smallest sapling. Completely excluding any construction above earth and water, from the atmosphere, is practically impossible. The two remaining conditions we can generally prevent.

1. We can remove the water by thorough seasoning, and in damp situations we can practically prevent its return by ventilation or resinous coatings.

Examples of remarkable durability of wood have been cited. With equal care in selecting and preparing the lumber, modern constructions might last as long. But while the wood of those old edifices was drying through years of preparation, the timber of modern constructions is translated from the primitive forest into a painted and varnished city dwelling in less than a single year's time. No wonder that in a very few decades, the whole structure is unsafe,‖ and that an odour of decay makes the mouldering rooms untenable.

Thorough ventilation is indispensable to the preservation of even well-seasoned *naked* wood in damp localities. The rapid decomposition of sills, sleepers, and lower floors is not surprising where neither wall-gratings nor ventilating flues carry off the moisture rising from the earth, or foul gases evolved in the decay of the surface-mould. In the close air of cellars, and beneath buildings, the experiments of Pasteur detected the largest per-centage of fungi spores. Remove the earth to the foot of the foundation, and fill in the cavity with dry sand, plaster-rubbish, &c., or lay down a thick stratum of cement to exclude the water, and provide for a complete circulation of air, and lower floors will last nearly as long as upper ones.*

Various expedients have been resorted to in order to hasten the seasoning process. Mr. P. W. Barlow's patent† provided for exhausting the air from one end of the log while one or more atmospheres press upon the other end. This artificial aërial circulation through the wood is prolonged at pleasure. However excellent in theory, this process is not practicable. By another method, the smoke and hot gases of a coal fire are conveyed among the lumber, placed in a strong draft. Some writers recommend the removal of the bark one season before felling the tree. All good authorities agree that the cutting should take place in the winter season.‡

An impervious covering upon undried timber is very detrimental, for by it all the elements of decay are retained and compelled to do their destroying work. The folly of oiling, painting, or charring the surface of unseasoned wood is therefore evident. Owing to this blunder alone, it is no unusual thing to find the painted wood-work of older buildings completely rotted away, while the contiguous naked parts are perfectly sound.

In concluding this part of the subject we may say, thoroughly season your lumber, afterwards cover it with varnish, paint, or pitch, or maintain around it a constant and thorough circulation of air.

2. We can remove the fermentable body, or chemically change its nature.

Woody fibre consists chiefly of cellulose and lignine. The former is very durable, and the latter moulders away but slowly, when exposed to air and moisture. But permeating through these, and increasing from the heart to the alburnum, are nitrogenous substances of the sap and immature wood, mostly vegetable albumen. These are the fermentable bodies we desire to remove or change. A patented process has been proposed to wash out the albumen by water flowing in at one end of the log while a vacuum was produced at the other. Theoretically satisfactory, this method does not seem to have been adopted. Boiling and steaming partly remove the ferment spores, but *may not* destroy the vitality of those remaining. For, according to Milne-Edwards, he has seen tardigrades resist the prolonged action of a temperature of 248° Fahr., and has known them to survive a temperature of 284° Fahr.§ That low forms of vegetation are fully as tenacious of life cannot be doubted.

Boiling and steaming also congulate the albumen at 140° Fahr. Although coagulated albumen is insoluble in water, the water of solution is, by this heating process, sealed up in the wood, and the cohesion of the latter is said to be diminished.

Albumen is also coagulated by sulphate of copper, pyrolignite of iron, chloride of mercury, chloride of zinc, &c. Some of the compounds thus formed are albuminates of the metallic oxides. Probably this is the reason why some of those salts are such excellent preservatives. But the researches of Kœnig‖ show that, when blue vitriol is employed, a certain portion of basic sulphate of copper remains combined in the pores of the wood so that water will not wash it out. The most resinous woods retain the most of the basic salt. Impregnated woods also contained, he found, less nitrogen than

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* Hunt's *Merchant's Mag.*, February, 1866, pages 106 and 107.

† Ibid., p. 105.

‡ *New American Cyclopædia*, vol. xiii., page 734.

§ *Scientific American*, February 17, 1866. Also Col. Berrien's (Chief C.E. of M. C. R. R.) estimate of their cost for the past two years on the "Michigan Central Railroad."

‖ Five cents, at 7 per cent. compound interest, amounts, in seven years, to 8 cents. 50 cents − 8 cents = 42 cents saved *on each sleeper* at the end of seven years. 0·42 dols. × 2,112 = 887·04 dols. saved per mile in seven years.

¶ De Bow's *Review*, February 1866, page 207.

** *Civil Engineer's Journal*, vol. xxiv., page 282.

†† "A properly constructed railway bridge of suitable materials may be fully relied on for twenty years."—*Journal Franklin Institute*, vol. xxxvi., page 1.

‡‡ *Civil Engineer's Journal*, vol. xxiv., page 282.

§§ *Journal Franklin Institute.*

‖‖ The *Builder*, vol. ii., page 638.

¶¶ Ibid., p. 616.

*** Ibid., p. 616.

††† *Civil Engineer's Journal*, vol. xxi.

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* "There is no reason to believe that fungi can make use of organic compounds in any other than a state of decomposition."—Carpenter's *Comp. Physiology*, page 165. (See also *Encyclopædia Britannica* on this subject.)

† "Powders suspended in the air are the exclusive origin, the first and necessary condition of life in infusions, in putrescible bodies, and in liquids capable of undergoing fermentation."—See translation of Pasteur's experiments in vol. xxxii., page 9, of *American Journal of Science.*

‡ "Some infusoria are not more than $\frac{1}{2400}$ of an inch in diameter, and if we suppose the spores to be only $\frac{1}{10}$ of the parent's linear dimensions, there must be an incalculable amount of germs no larger than $\frac{1}{24000}$ of an inch in diameter. Since, according to Sullivant and Wormley, vision, with the most powerful microscopes, is limited to objects of $\frac{1}{4000}$ of an inch, we need not be surprised that we do not always see the floating germs of animals and plants."—Note by the translator of Pasteur's researches, *American Journal of Science*, vol. xxxii., page 9.

§ Notes on Prof. A. B. Prescott's "Lectures on Organic Chemistry" in the University.

‖ For an account of the rapid destruction of the floors and joists of the Church of the Holy Trinity, Cork, Ireland, by dry rot, see *Civil Engineer's Journal*, vol. xii., page 303. For an account of the decay of floors, studs, &c., in a dwelling, see the *Builder*, vol. vi., page 34.

"In some of the mines in France the props seldom last more than fifteen months."—*Annales des Mines.*

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* The *Builder*, vol. xi., page 46.

† *Civ. Eng. Jour.*, vol. xix., p. 422.

‡ Experiments detailed in the *Cosmos* show conclusively that winter-cut pine is stronger and more durable than that cut at any other season of the year.—*Amer. Sc. Discovery* for 1861, page 346.

"Oak trees felled in the winter make the best timber."—The *Builder*, 1859, page 138.

§ "Although, in ordinary cases, the death of animals takes place when the temperature is sufficiently high to coagulate the hydrated albumen in their tissues, we know that this is not always so in the case of those previously dried. I have seen tardigrades resist the very prolonged action of a stove whose temperature stood at 120° C., and in the researches of Mr. Doyère, the heat was carried to 140° C. (284° F.) without death ensuing from the heat."—Mr. Edwards on "Spontaneous Generation."—*Am. Jour. Science*, vol. xxvii., page 405.

‖ *Am. Jour. Science*, 2nd series, vol. xxxii., page 274.

natural. It is even possible, he states, to remove all the azotized compounds by long immersion in the sulphate solution. The albuminous substances first precipitated by the solution, are re-dissolved by excess, as in case of concentrated sulphuric and muriatic acids.* The operation of such solutions should, therefore, be one of lixiviation. Kœnig hopes, similarly, to explain the action of the chlorides. A recent experiment on animal albumen by Professor Prescott shows that its precipitate by the chloride of mercury, is also soluble in excess of the chloride solution. From this we may conclude that the antiseptic qualities of the chlorides depend, at least partly, on their dissolving out the albumen.

But could all the nitrogenous substances be removed, thereby preventing fermentation, the cellulose and lignine of unprotected wood would slowly decompose. Hence the salt used should act on those substances also. According to good authority, sulphate of copper has this action. M. Weltz maintains that, after a time, the sulphuric acid leaves the base, and acting upon the timber, carbonizes it. He has seen the props in a mine, opened 1800 years ago, charred by the free acid thus eliminated, and in a perfect state of preservation, while their surfaces were covered with metallic copper in regulus.†

The use of corrosive sublimate was patented by Mr. Kyan in 1832; that of chloride of zinc by Burnett in 1838. M. Boucherie has used solutions of blue vitriol and pyrolignite of iron. Easy impregnation of the wood is the great merit of his method.

Each process has in turn excited the most extravagant hopes, and neither has justified a tithe of the expectations formed. While "kyanizing," "burnettizing," or the use of any salt whatever, has not prevented the ravages of *Teredo navalis* or *Limnoria terebrans*, each of the processes named improves the durability of wood exposed to dampness. Each is, therefore, worthy of explanation here.

Kyan's specified solution ‡ was one pound of chloride of mercury to four gallons of water. Long immersion in the liquid in open vats, or great pressure upon both solution and wood, in large wrought-iron tanks, is necessary for the complete injection of the liquid. The durability of well-kyanized timber has been proved, but the expensiveness of the operation will long forbid its extensive adoption.

For "burnettizing," § a solution of chloride of zinc, one pound of salt to ten gallons of water, is forced into the wood under a pressure of 150 lb. per square inch.

Boucherie employs a solution ‖ of sulphate of copper one pound to water twelve gallons and a half, or pyrolignite of iron one gallon to water six gallons. He encloses one end of the green stick in a close-fitting collar, to which is attached an impervious bag communicating through a flexible tube with an elevated reservoir containing the salt liquid. Hydrostatic pressure soon expels the sap at the opposite end of the log. When the solution makes its appearance also, the process is completed.

He finds the fluid will pass *along* the grain—a distance of 12 ft.—under a lower pressure than is required to force it *across* the grain, three-fourths of an inch. The operation ¶ is performed upon green timber with the greatest facility.**

THE REMAINS OF THE ROMANS IN CARLISLE.

AT the last meeting of the Cumberland and Westmoreland Antiquarian Society, Mr. J. A. Cory read a paper on Carlisle Cathedral. Subsequently, Dr. Bruce gave an account of the Roman remains recently found in Carlisle. As Englishmen, Dr. Bruce said, we must be interested in the past history of our country. Unhappily a large part of the earliest history of Britain is mainly dependent upon the researches of the antiquary: it must be dug out of the ground by the spade and the pickaxe. Even in cases where the historian does come to our aid, the researches of the antiquary are often necessary, in order to correct his chronology and rectify many of his statements. For example, the statements of Gildas, the first British historian, as he is called, can only receive full credence when they have been sifted and rectified by the Roman inscriptions and the hordes of coins which are turned up from time to time. Even in cases where we have to deal with historians of undoubted credit, the researches of the antiquary lend additional interest to the pictures of the analist. Tacitus, for example, tells us that Agricola commenced the battle of the Grampians by ordering forward some Tungrian and Batavian cohorts. How interesting it is to find buried in some of the wildest parts of the North of England, where they must have lain undisturbed since the days of Roman occupation, slabs and altars carved by Roman hands, which mention both Batavian and Tungrian cohorts. The stone gives vitality to the lettered page. In Cumberland a vast field opens itself to the labours of an archæological society. The ancient roads of this part of the country are yet to be accurately traced. In Northumberland much has been done in this matter, and that almost entirely through the agency of one honoured individual—the late Duke of Northumberland. At his request Mr. Lauchlan not only surveyed the Roman Wall, but the Watling-street from the Scottish border to the Tees, the Devil's Causeway, and the various branch roads communicating with these. He also surveyed the ancient British and the Saxon and Danish encampments in large districts of that county. He is now laying down the combined results of all his investigations in a map of ancient Northumberland. It is, perhaps, not too late to undertake a similar work for Cumberland. It may be that some large-hearted nobleman with ample means will resolve that it shall be done. But if it be thought too great a task for individual enterprise, the combined efforts of a society like this might accomplish much. The facilities for doing it are greater now than they ever were. The sheet plans of the ordnance survey form an excellent groundwork for such a map. No doubt, where the ancient roads are still to be seen, they will be laid down by the ordnance surveyors; but, in the majority of instances, these roads have been ploughed up, and their former existence can only be ascertained from the testimony of old men and the records of the local historians of the last century. There is no time to be lost: each winter makes sad havoc amongst those who were plough-boys in 1801. I am the more anxious upon this subject, for I feel sure that important results would appear. It seems to me that the Romans took a firmer grasp of Cumberland than of any other part of the north of England. Besides, the stations on the wall, including Burdoswald and Bowness, and all between, a chain of forts, the chief of which was Maryport, has extended all along the coast. These have evidently been intended to prevent the enemy, whether from Scotland or Ireland, landing within the wall. A road has connected these coast defences. Besides all this, several stations some miles removed from the wall and the seacoast, have been planted in the interior, with the view of sustaining the garrisons that would have to bear the first brunt of hostile aggression. Such were Old Carlisle, Plumpton, Papcastle, and others. A network of roads has evidently connected all these camps together. How desirable it is that all these stations, and fortlets, and roads should be clearly set down in a map of ancient Cumberland. And besides, every ancient British barrow and camp, every Danish camp, every Border tower and Peel house, ought to be carefully marked. There is another matter connected with Roman antiquities that some members of this society might undertake. I refer to the formation of accurate catalogues of Roman coins that have been found in any particular locality. Such catalogues would be of historic importance. Coins give us an approximate idea of the time during which any station has been occupied by Roman troops. [Having given some examples in illustration of this, Dr. Bruce proceeded:—] On examining a list of coins you can form some idea of the degree of activity which has prevailed at different times in the station in which they were found. I had the advantage of examining last week the coins at Nether Hall, which had been found in the neighbouring station of Maryport. They have been carefully arranged by the Mr. Senhouse of the last generation. I am disposed to think that the station was first occupied by Hadrian, the personal friend of his father, Marcus Mœnius Agrippa, whose name occurs on some of the altars found. There was possibly an engineer employed in its construction. At the time Hadrian visited England, A.D. 120, the coins of his predecessors Trajan would constitute the larger part of the currency of the empire. It would be mingled also with some of the coins of previous reigns and a few pieces of the republican era. After the time of Antoninus the coins diminish in number. It is remarkable that the only coins of the time of Severus are one of his wife and one of his youngest son. From evidence akin to this I am disposed to think that Severus chiefly expended his energies in the central part of the line—the path that he chose in his advance into Scotland, and by which he probably retreated. At all events, a carefully constructed catalogue of all the coins found in the various localities occupied by the Romans in Northumberland and Cumberland would throw light upon this subject. To revert once more to the collection of coins at Netherhall, I notice that the number increases during the reigns of what are called the "thirty tyrants," several of them being supposed to have assumed the purple in Britain and Gaul. The number belonging to Constantine the Great is considerable, 13. The usurpation of Carausius and Alectus had been put down, and Britain, in common with the rest of the world, enjoyed peace. The intercourse with Rome must have been considerable. The station must have been in a state of poverty towards the close of the series. Of Valentinian I., who died in 375, there is only one coin; of Theodorius, who died in 395, there is only one; and the same is the case with the last reign of which there is an example, that of Honorius. The date of this last coin I take to be A.D. 417. In a year or two after that time the station was probably abandoned. Objections will, I know, be brought against any conclusions derived from a single collection of coins. Accidental circumstances may influence it. That is true, but if we have a numerous body of catalogues to reason upon, we may build our conclusions with safety, for in this case the law of averages comes to our aid. Amongst the coins at Netherhall are several pewter denarii. As they were dug out of the camp there is no doubt that they are ancient forgeries. As early as the period of Claudius false coins were imported into Britain. I have been speaking of Roman coins. A collection of English coins has a corresponding value. If all the coins of the fourteenth century that have been found in Cumberland had been carefully catalogued, we should have been able to trace with greater accuracy the marches of the three first Edwards to and from Scotland. One thing I wish much that this society would undertake, and that is the preparation of an accurate history of Roman Carlisle. I am persuaded that Carlisle has been a place of great importance in the Roman period. It was the seat of comfort and luxury, and hence, also, probably of commerce. The ornaments and vessels found in it are much superior to those found in the stations of the Wall. If all that are still in existence could be collected in one place it would be found to what an extent the elegances and luxuries of life were enjoyed in it. A map might surely be prepared marking the course of the wall which probably surrounded it,—its gates, its principal streets, the spots where the most important remains have been found, its wells, its burying-ground, and other details. A memoir of Roman Carlisle, after the model of Mr. C. Roach Smith's Roman London, would be an effort worthy of this society. Another point of great importance which may be accomplished by this society is the preservation of the sculptured and inscribed stones in which this neighbourhood abounds. In the south of England there is an almost total absence of these memorials of an era long past. We are rich in them. On us devolves the responsibility of taking care of them and rendering them easily accessible to all who wish to study them. An individual digs up an altar, he is pleased with it at first, but when the novelty is worn off he ceases to care about it and gives it away. It is soon lost sight of, and then is destroyed. And then again great labour and expense is imposed upon those who study Roman antiquities by the wide diffusion of the remains of even a single station. In the course of my own investigation of the antiquities of the Wall, I have often had to undertake a whole day to travel to see a single altar; and to save myself a journey and voyage to the Isle of Man I had to have sent me the cast of an altar which had been taken from Maryport to Castleton. It is important that the antiquities found in this neighbourhood should as much as possible be

* Brande and Taylor's Chemistry, page 634.
† Annual Sc. Discov., 1865, page 51.
‡ *Civil Engineer's Journal*, vol. v., page 202.
§ *Ibid.*, vol. xiv., page 471.
‖ *Ibid.*, vol. xx., p. 405.
¶ As a modification of this method he also cut a channel in the wood throughout the circumference of the tree, fitted a reservoir thereunto, and poured in the liquid. The vital forces speedily disseminated the solution throughout the tree.
** To be continued.

THE AMERICAN NATIONAL ACADEMY OF DESIGN.

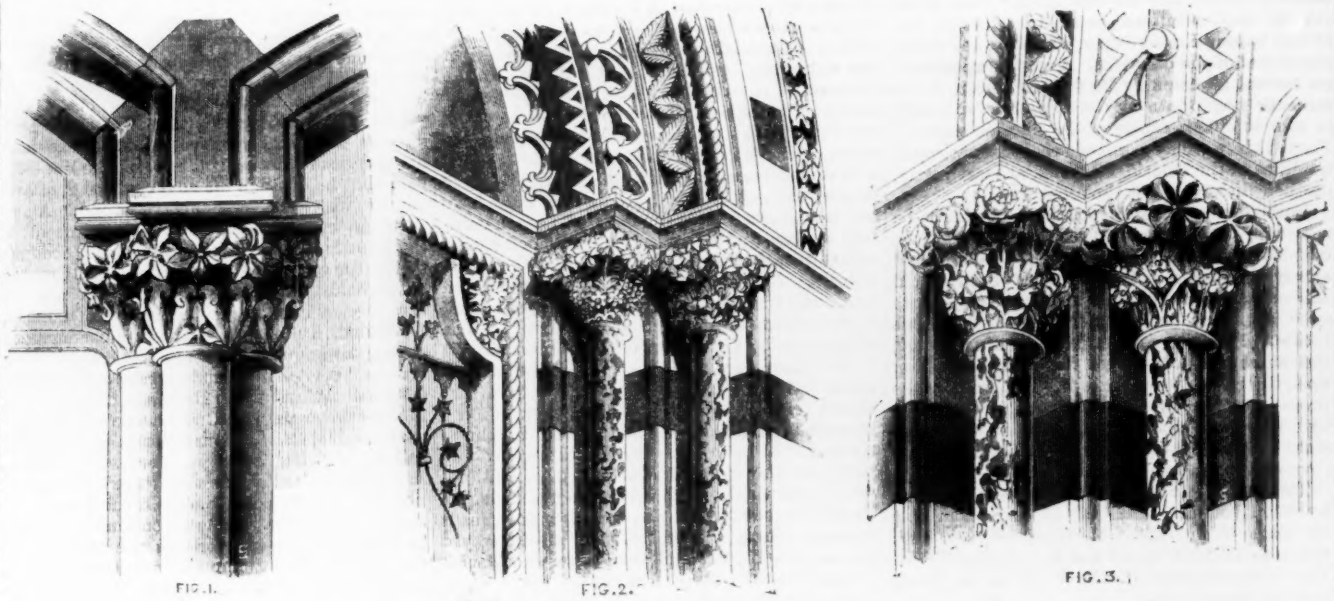
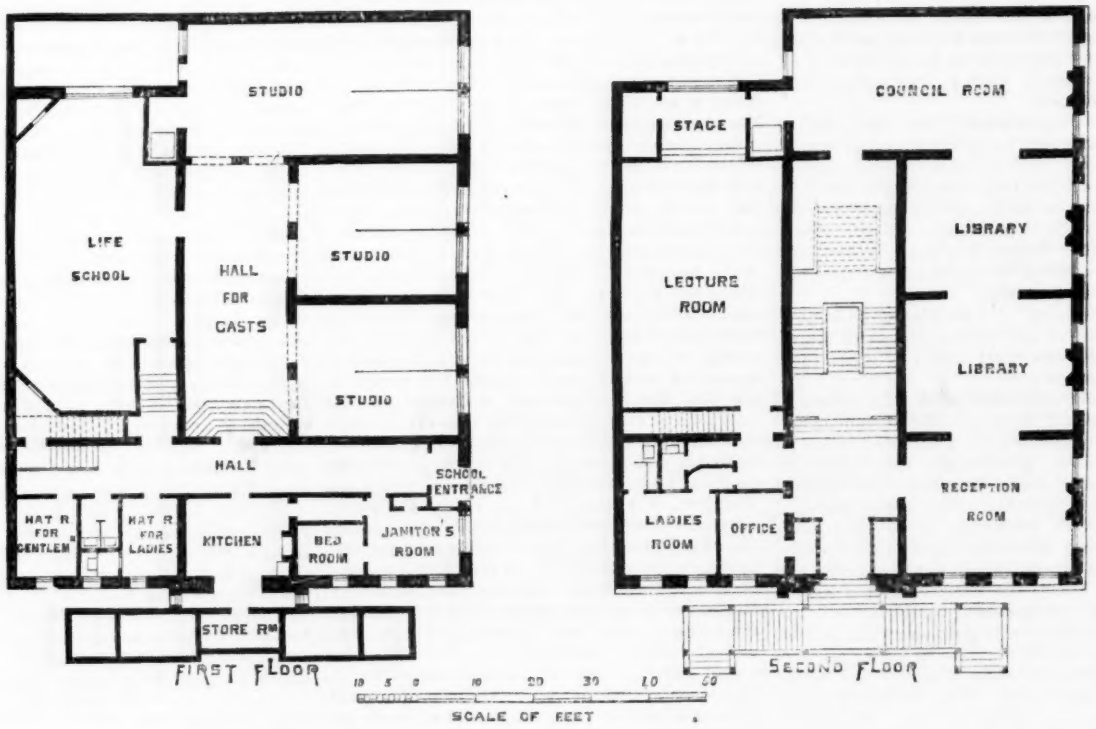
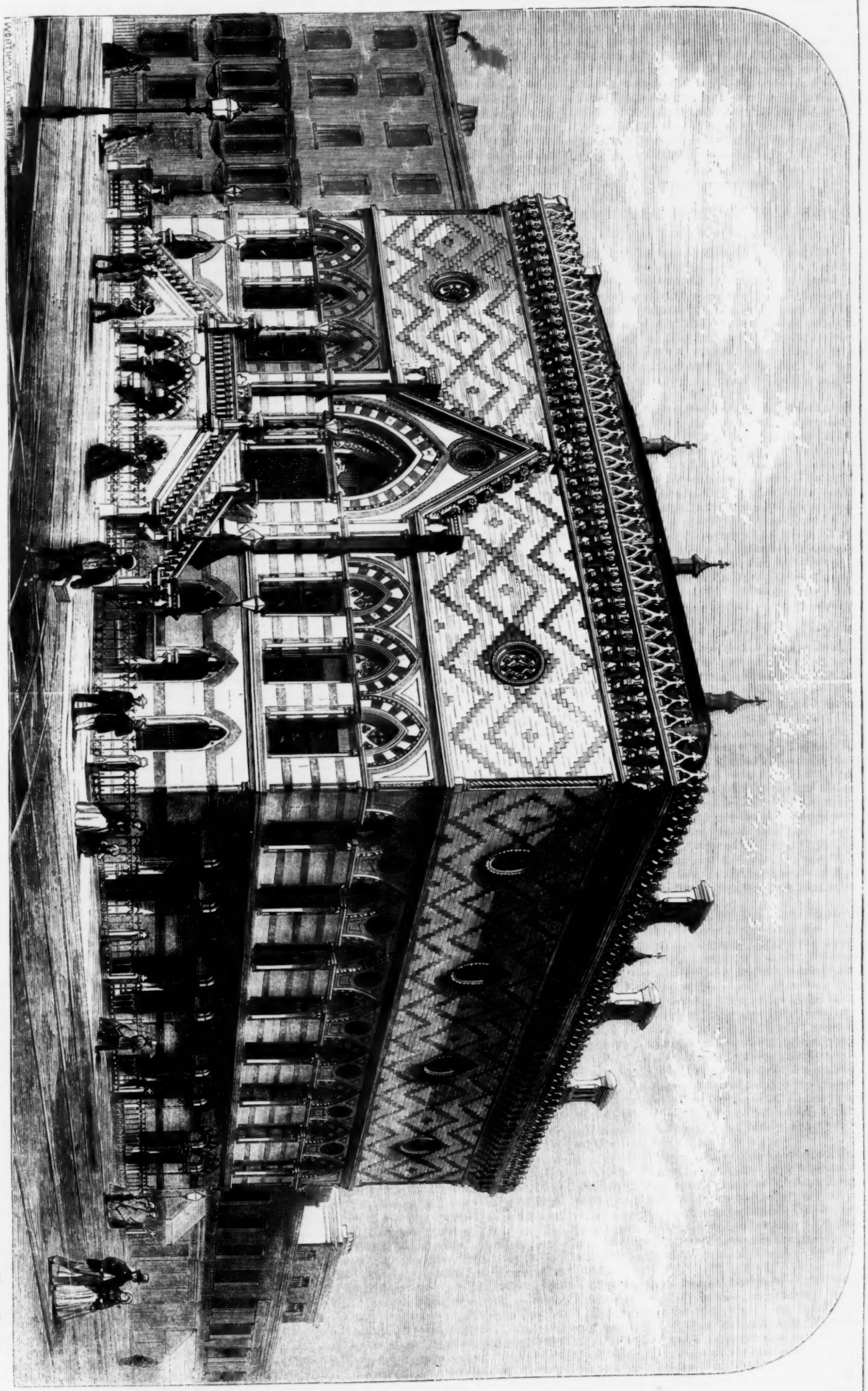


FIG. 1. FIG. 2. FIG. 3.

Carved Capitals.



concentrated together. If a museum could be formed in Carlisle upon a permanent basis much good might result—if it cannot be formed I would recommend that the inscriptions that are at present scattered about should be sent to museums that are already established, and of whose permanence there can be no doubt. I have to apologize for my boldness in making these suggestions. I pray you give them only so much attention as they are found worth. My interest in the subject and my desire for your prosperity have influenced me in saying thus much. Having read so far, Dr. Bruce said that circumstances had prevented him writing more, and he proceeded to describe *ex tempore* a number of Roman altars recently discovered in Cumberland, illustrations of which were placed in the hands of the visitors. When he was recently examining some antiquities at Netherby an intelligent farmer had expressed his surprise that "the Romans had copied so famously our English letters." Children at school were little aware from what source they derived the very first elements of knowledge—the Romans were their first schoolmasters. Among the altars which Dr. Bruce proceeded to describe were some found during the excavations in Carlisle for the sewerage works, and for the offices of the *Carlisle Journal*, one found at Maryport (now in the possession of Lord Lonsdale) and one discovered the other day at Silloth. With respect to the altar found at Silloth, Dr. Bruce said it was about 10 in. high. At Skinburness there had been an ancient harbour or creak before the year 1301, and there was a thriving borough or port; but a great eruption of the sea carried away the harbour and greatly damaged the town. The making of a harbour at Silloth recently had changed the sweep of the sea, which had exposed a quantity of boulder stones upon the shore, and this altar had been found. The conclusion he drew from it was that the Romans had had a little fortress at Skinburness. The altar bore the inscription "Matribus Parcis." Dr. Bruce also described a Roman coin of which there was an illustration upon the sheet in the hands of the members. Those Roman coins, he remarked, were wonderful productions, and it was important to have contemporary portraits of the rulers of the earth in those days. They could be perfectly certain as to their accurateness. Unlike the portraits of the Queen upon our coins—which were always the same—we frequently found their growth from youth to age. Nero he had found on many of the coins as a chubby-cheeked innocent-looking youth, and at last as a bloated sensualist. Commenting upon the names found upon some of the altars, Dr. Bruce said they showed that Spaniards, people from Languedoc or elsewhere, had been among us, and they proved how virgorous were the efforts made by the Romans to subdue England and to keep it in their possession. He had no doubt that the discipline the people of this country underwent in those times had been of the greatest service in forming the English character.



THE NATIONAL ACADEMY OF DESIGN, NEW YORK, U.S.—MR. P. B. WIGHT, ARCHITECT.

[See p. 21, *ante*.

THE SANITARY ACT OF 1866.

THE regulations under this Act relating to lodging-houses, and for which we long fought, are now coming into operation. Rules approved by the Home Secretary have been issued by several of the districts in the metropolis. Those issued by the Board of Works for the Poplar district we have already spoken of. The rules for the St. Giles's district are also very stringent. Among the most important it is specified that no person shall let any house, or part of a house, in lodgings, or to be occupied in lodgings, by members of more than one family, and in which more than two persons shall sleep in one room, until such house, and the person proposing to let the same, are registered in the office of the Board of Works. In no case will an accommodation of less than 400 cubic feet of space be allowed to each person. Persons letting such house, or part of a house, must have the walls and ceilings of every room, &c., thoroughly cleansed and limewashed at least four times every year. Cellars are to be cleaned out once a week, and limewashed as often as needed. The rooms are to be ventilated, &c., to the satisfaction of the medical health officer. Proper accommodation must also be provided for washing, and such a supply of water for the use of lodgers, with proper covered cisterns, as shall be satisfactory to the health officer. The cistern must afford at least fifteen gallons a day to each inmate. The dustbin must be emptied once a week, and for every twenty persons a separate water-closet is to be provided. Every house is to be properly drained. Every owner not resident in or near the registered house must appoint, as agent, some person who is resident in or near to the house to see that the regulations are carried out. Every house and room shall be open to the medical health officer for inspection between the hours of eight o'clock a.m. and ten o'clock p.m. Any persons violating the regulations will be liable to a penalty not exceeding 40s. for any one offence, with an additional penalty, not exceeding 20s., for every day during which a default in obeying such regulations shall continue.

As we have already said, great discretion will be requisite in the carrying out of the powers of the new Act. There is otherwise a risk not only of inflicting much suffering as well as inconvenience on the struggling poor, especially those with large families, but of rendering the Act utterly inoperative, useless, and impracticable, from attempting too much at the outset.

One of the most annoying results of sanitary pioneering has been the ridiculous lengths to which the desired change of public opinion is apt to go, and the false teaching of quasi reformers under such circumstances. Take the metropolitan omnibuses as an example. They used to be close and stuffy, and utterly devoid of ventilation, as indeed a portion of them still are. Since the public, however, have been better taught as to the importance of ventilation, the wiseacres who construct many of our omnibuses have them (on the principle apparently that there cannot be too much of a good thing), stuck all over with "ventilators," and especially in front, *behind the horses and drivers*; so that, while the omnibus is thus turned into a complete funnel with draughts, the passengers, at the same time, have the benefit of breathing the cast-off steam and gases from the horses and the sitters on the front outside; and it is a fact that not unfrequently the most nauseous smells enter through these funnel-holes, which for the better "vintilashin" of the 'bus, are actually now made for winter no less than summer use on the open and fixed venetian-blind principle appropriate to stables and cow-sheds!

We are sure that our strictures and warnings will not be misunderstood when it is remembered that the conductor of the *Builder* himself was the first public suggester and advocate of the new sanitary powers with reference to lodging-houses, which have recently been adopted by the Legislature. All that is requisite is to bring these powers to bear upon the present state of things *by degrees* and *gently*, even in cases where there is glaring need for amendment. Let *Festina lente* be the motto of the authorities, and all will be well.

There is one point on which we may say a word for taste and art in a humble sphere before we conclude. Hundreds of the lodging-houses with which the new Act is empowered to deal have their walls papered with cheap but cheerful and pretty paperhangings, in which, often, both lodger and landlord take a pride. Are all the walls of such lodging-houses to be henceforth stripped entirely of their ornamental coverings, in order that they may be "limewashed at least four times a year?" We are quite aware that there are evils connected with old and bad papering of room walls, but surely these might be regulated and remedied without so harsh an interference with the tastes and comforts of the poor. The papers usually put on (often by the lodgers or landlords themselves) are extremely cheap,—from 5d. for twelve yards:—could it not be ordered that such papers shall be removed, say once a year, and the walls scraped and cleansed before new paper is put on?

SANITARY.

Proceedings of the Chelsea Sanitary Committee.—When cholera threatened the parish, a committee of nine members was appointed by the vestry to watch its progress, and to take all proper preventive and other measures for its diminution. The committee appointed five medical visitors, with salaries of 10 guineas a week, and ten assistants with salaries of 3½ guineas, and other active measures were adopted, all of which are now detailed in a full Report of the Proceedings of the Committee, printed by authority for private circulation among the members of the vestry. These proceedings, no doubt, greatly checked the progress of the epidemic, and facilitated its final removal from the parish.

St. Marylebone Parish.—The medical officer of health for this parish has just issued his report for the year 1865. The annual rate of mortality for the entire parish was 24·95 per 1,000 population, being nearly 1 per 1,000 below that of the previous year. The mortality was highest in Christchurch sub-district, small-pox, fever, measles, being most prevalent and fatal. The annual death-rate in that sub-district was 28 per 1,000 living. In Cavendish-square sub-district the proportional number was only 18 per 1,000. Some striking instances have occurred of the apparent efficacy of sanitary measures in arresting the progress of cholera; and it is suggested whether these measures might not be adopted with similar success during the prevalence of smallpox, which has broken out with frightful activity in the vicinity of Lisson Grove. It is mentioned that the progress of sanitary works has been satisfactory: 1,240 ft. of new sewers were constructed, 7,688 ft. of new pipe-drain laid down, 83 cesspools have been abolished, and water laid on to 326 closets. The water is supplied to the parish by the West Middlesex Company, whose source of supply is the river Thames at Hampton, Middlesex.

SCHOOLS OF ART.

The Keighley School.—The annual meeting of this School has been held in the hall of the Mechanics' Institute, at Keighley. There was only a small gathering. Mr. T. H. Ingham, of Marton Hall, occupied the chair; and, in course of his address, said, in reference to general education, that after all there were schools sufficient, and the difficulty was to overcome the inertia of parents in getting them to send their children to schools; and he believed they would never overcome the difficulty until they adopted a system which had an ugly name, and that was, compulsory education. National interests—for the wealth of the nation depended on its manufactures—were involved in Schools of Art. As an institution, they were quite new in the country. They only began, as it were, after the Exhibition of 1851, when our deficiency in artistic manufacture was very manifest; but when the Exhibition of 1862 was held it was shown what advantage had been derived from the Schools of Art; for, instead of being outstripped in design, we were outstripping our neighbours. National interests, therefore, were involved; and the question was one for all classes; and the working men had shown what they could do if they only received encouragement. They would remember the story of Benjamin West, the painter. When a boy, he was left at home by his mother to rock the cradle, and while alone he made a drawing for which he received a kiss when his mother returned. That kiss, he said, made him a painter; and, said the speaker, what that kiss was to West, let their smiles and encouragement be to the Keighley School of Art. The report stated that during the past year 71 students had attended the male classes, with an average attendance of forty for each term. The ladies' class, which had been formed this year, had been attended by seven young ladies, and the work they had executed was considered very creditable. The classes are still under the superintendence of Mr. Walter Smith, head master of the Leeds School of Art, and are regularly taught by Mr. Andrew Stevenson, assisted by Mr. W. H. Jackson, late a successful student in the school. The prizes were ultimately distributed.

THE MODELS IN THE CRYSTAL PALACE.

THE KIEFF BRIDGE.

AMONG the many works of art consumed by the late fire at the Crystal Palace, were the extensive and valuable collections of naval and engineering models, placed in the galleries of the Tropical Department. Conspicuous among these was the model of the great suspension-bridge, half a mile in length, over the river Dnieper, at Kieff, in Russia, erected about fifteen years ago, by Mr. Vignoles, F.R.S., for the then emperor, at a cost of nearly half a million sterling.

This model was first shown in London at the Exhibition of 1851, and was subsequently placed, on loan, in the Crystal Palace, where it had remained many years. It was considered a remarkable work of mechanical skill, and was constructed at an expense of several thousand pounds. The loss to Mr. Vignoles is irreparable, though a duplicate model remains in the Engineering Gallery at St. Petersburg, placed there by the Emperor Nicholas I., to whom it had been presented, with the Imperial permission. A few notes of the bridge will not be out of place with reference to the beautiful and singular work, destroyed, with so many other most interesting objects of nature and of science, exhibited in the Crystal Palace.

The architecture of the river piers is rather novel, and of a striking character, harmonising with that used in the extensive range of first-class fortresses which crown the heights of Kieff. The portals through the piers have a clear breadth of 28 ft., and a height of 35 ft. to the soffit of the semi-circular arches. The platform has nearly 53 ft. of extreme breadth, of which nearly 35 ft. is for carriage-way. The platform is suspended from four chains, all on the same horizontal plane, two on each side of the road: the footpaths project beyond the chains, and are carried by cantilevers round the piers exteriorly; so that the foot-passengers are completely separated from the horsemen and carriages.

The chains are composed of links, 12 ft. long, each link weighing about 4½ cwt. Eight links form the breadth of each chain; the total length measured along their curves being nearly two English miles.

For the swivel bridge the iron employed therein is almost exclusively malleable. The bridge is moved horizontally (on the same principle that locomotive engines are sent round on the large turn-tables at a railway station), and by the efforts of a few men only, acting on a very simple apparatus. The construction of the platform of the bridge presents several novel combinations of wood and iron, and is of most remarkable stiffness, to resist the violent action of the eddies of air in violent winds, which have so often injured and even destroyed the ordinary platforms of suspension-bridges in other places.

The total weight of iron used in the construction of the bridge was about 3,500 tons, including the machinery used in the various stages of its construction.

A whole village of warehouses, offices, shops, sheds, dwelling-houses for the superintendents, and comfortable cottages for the numerous workmen, was erected on the left bank of the river, on ground expressly raised for the purpose above the flood-level; a regular commissariat was attached to the establishment; and the whole organization of service made very complete.

Not the least remarkable part of the establishment was that for the manufacture of the hydraulic cement required for the foundations and masonry. It is, in fact, an "*artificial puzzolana*," made from a peculiar clay found in the Kieff hills, and prepared on the principles laid down by the celebrated French engineer, Vicat, in his recent publication on puzzolanas. The buildings for this purpose were very extensive, being gigantic laboratories, where the operations

were carried on day and night. Eight large roasting ovens, besides numerous grinding mills, in constant action, manufactured upwards of 300 bushels (or about 500 cubic feet) in every twenty-four hours.

This bridge is, perhaps, the largest in Europe, the length being nearly half an English mile, and covering an area of 140,000 square feet,—considerably more than 3 acres.

The bridge was opened with great ceremony on the 10th of October, 1853, by the Grand Duke Nicholas of Russia, the third son of the Emperor Nicholas, attended by all the ecclesiastical, military, and civil authorities, and almost the whole population of Kieff. It has since been constantly travelled over, particularly by artillery, cavalry, and troops entering and leaving the fortress, which is the great central military depôt and arsenal of the South of Russia. The total cost was about 432,000*l.* sterling.

THE LOCAL GOVERNMENT OF THE METROPOLIS.

ON Tuesday last, a numerous and influential deputation from the Metropolitan Municipal Association for Promoting the better Local Government of the Metropolis, waited upon the Secretary of State for the Home Department, in accordance with the terms of a resolution passed at a recent public meeting at St. James's Hall, with the view of inducing the Government to initiate immediate legislation on the subject. The deputation was introduced by Lord Ebury, the president of the association. Mr. Buckmaster, hon. sec., Mr. J. Beal, Mr. C. Buxton, M.P., Mr. T. Hughes, M.P., Mr. Reardon, M.P., Mr. J. M. Ludlow, Mr. Godwin, the Hon. F. Byng, Mr. Begg, Mr. Dresser Rogers, Mr. Peter Graham, and others having addressed the Home Secretary,

Mr. Walpole said, it would be premature for me to give any opinion at present as to the details of the measure to be submitted to Parliament, but I may say that I hold the opinion that the government of the metropolis might be greatly improved, and that one of these improvements would be the establishment of larger areas with smaller authority; but having said that I hope you will excuse me from expressing any further opinion. I will only say in addition, that I will give the subject my best attention, and will take care to communicate to her Majesty's ministers what has passed, but I hope you will not ask me to give any further pledge.

We shall return to the object the Association has in view.

A HINT TO PATENTEES.

THE Commissioners of Patents have just issued a new order which is of importance to all intending patentees. The order runs as follows:—

"After the 31st day of December, 1866, every applicant for Letters Patent shall deliver at the Office of the Commissioners, with his provisional specification, or (when a complete specification is filed with the petition and declaration) with his complete specification, an abridgment, in duplicate, of such provisional or complete specification. The abridgment must describe, in as short a manner as possible, the features of novelty which constitute the invention. The abridgment and the copy thereof must be written upon sheets of foolscap paper, and upon one side only of each page, leaving a margin of one inch and a half on the left-hand side of the page.

Dated the 17th day of December, 1866.

(Signed) CHELMSFORD, C.
ROMILLY, M.R.
JOHN ROLT.
JOHN B. KARSLAKE."

We do not quite understand the object in view, but it is apparently intended to make use of this document as "copy" for the series of abridgments published by the commissioners, and thus to save the money now paid to the gentlemen who are engaged on the work. We have already expressed our opinion of the value of these abridgments,* but we do not think that this is the way to increase their usefulness, and inventors will not thank the commissioners for adding to their burdens. The inventor has already to deposit duplicate copies of his provisional and final specifications, which are used as printers' copy. An extra copy of the drawings has also to be deposited, which is only of use during the few days that the original is in the hands of the lithographers. In some cases, these extra copies are very costly, and now the inventor will be put to a further expense in preparing this abridgment. There is also another question of some importance, viz., the exact legal value of the new document. Supposing a discrepancy to exist between the specification and the inventor's "abridgment," will it be possible to make this want of agreement a foundation for setting aside the patent in a court of law, as is now done, in case the provisional and final specifications do not agree? The commissioners, we believe, will have no power to refuse an inspection of these documents; and will also, if we understand 16 & 17 Vict. c. 115, sec. 4, be bound to grant office copies, which could hardly be denied as evidence by a judge. In case these abbreviated descriptions are printed intact, the abridgments will have an official character which they do not possess at the present time, inasmuch as they will contain the inventor's own description of his invention. But we do not consider this to be of any advantage, inasmuch as the commissioners' abridgments were never intended to "supersede the necessity for consulting the specifications," to use the words of the notice prefixed to each volume. No two patentees, moreover, will form exactly the same idea of the commissioners' requirements as regards the nature and length of the abstract required, and as a natural consequence, there will be a want of uniformity — some will be too long, others too short. Supposing however, that these documents be found to require examination by a skilled person to see if they really do give a concise and intelligible account of the essence of the invention, then we are at a loss to understand what advantage will be gained. The person who is able to judge whether the abstract comes up to the standard, would also be capable of abridging the specification; and the time occupied in the two processes would, in most cases, be about the same, so that there would be no saving of expense under this head. We shall be curious to see how the system works, and to know the legal value of the new document. In the mean time, we would advise inventors to be very careful in drawing up their "abridgments," and suggest that they should, where possible, use the exact words of their "provisional," or of their claim in the "final" specification.

* *Builder*, vol. xxiv., p. 663.

FROM IRELAND.

Leighmoney.—St. Mary's Church here has been consecrated. The edifice is built from a design furnished by Mr. William Atkins, of Cork, architect. It stands close by the bank of the Innoshannon river, near the fine, old, umbrageous woods of Shippool, having in its front the castellated and ivy-clad ruin of that name. In form it consists of nave and chancel, with semi-circular termination; tower, spire, porch, and robing-room. The spire is supported by eight marble shafts resting on the upper part of the tower. The porch also rests on marble pillars. The masonry is enriched with bands of red brick and voussoirs in the arches. Internally the walls are lined with red, yellow, and black brick and tiles, arranged in patterns. The steep-pitched roofs are of stained deal, the principals carried by stone corbels. The passages of the church and chancel are paved with different coloured tiles. The sittings, which can accommodate about 80 persons, are all open, and of deal stained like the internal roofing. The site of the church was granted free of rent by Mr. T. B. Herrick, of Shippool.

THE ANCIENT LOUVRE, PARIS.

THE excavations in the court of the Louvre to discover the site and boundaries of the Philip-Augustus tower are nearly all filled in and levelled. Some openings are to be left leading to the underground story, for the purpose of gaining access to it if necessary. The vaults which were filled with earth have been completely cleared.

The great tower of the château of Philip Augustus and of Charles V., which has been laid bare by the excavations in the court-yard of the Louvre, and known by the names of Tour Neuve, Philippine, and Ferrand, stood fronting the entrance opposite to the Pont des Arts. The foundations are of considerable depth, and commenced at the ancient level of the bank of the river. This building was 96 ft. high, with walls 12 ft. thick, and was surrounded by a deep ditch. The precise date of its foundation is unknown; but it is known that in 1204 this tower had been but recently built, since in that year Philip Augustus declared that he owed 30 sols to the prior and brethren of St. Denis-de-la-Châtre on account of the tower of the Louvre, which he had built on their land. At this period, the edge of the river which bathed the Louvre was called the Rivage de St. Denis. The new tower being, moreover, in the seigneurie of the bishop and chapter of Notre Dame de Paris, they were entitled to compensation, and the king charged the provost of Paris to make the Parisians pay the indemnity. Celebrated in the feudal annals, the terror of vassals and a *séjour de détention*, the tower of the Louvre was also employed as a place of deposit of the royal treasures. Access was gained to the upper portions by a winding staircase. The entrance was defended by an iron door with numerous locks and bolts.

This donjon was also the centre of royal authority, and the great functionaries of state came there humbly to take the oaths of allegiance and homage. After about three centuries and a half of existence, the tower and buildings forming the *ensemble* of the parallelogram of the castle were demolished, and Francis I. laid the foundation of a new palace, after the designs of Pierre Lescot. Among the materials brought to light by the excavations in the court of the Louvre some evidently belong to a period anterior to the epoch of Philip Augustus. There exists a diploma, reported in the history of the University, which affirms that in the seventh century a royal mansion was built on this site, in the reign of Dagobert; and that in the twelfth century a château was built. The fortress of Philip Augustus succeeded this last construction.

REPORT OF METROPOLITAN BOARD OF WORKS.

THE Metropolitan Board's report for 1865-6 has been published.

Amongst the various important subjects treated of are the claims in respect of the Thames Northern Embankment, which were,—for freeholds, leaseholds, &c., 311,257*l.* 11s. 1d., which were settled for 211,374*l.* 10s. The claims for the new street to the Mansion House were—freeholds, leaseholds, &c., and yearly tenancies, 1,184,723*l.* 7s. 5d., which were settled for 1,059,234*l.* 6s. The claims in respect of the Thames Embankment (South) were—freeholds, leaseholds, &c., 142,742*l.* 14s. 5d., which were settled for 109,975*l.* The whole of the building plots in Garrick-street (which was opened to the public in March, 1861) have been let on leases for eighty years, with one exception, where the term is fifty years. The aggregate rental received for these plots is 2,484*l.* per annum. The Board would have proceeded to sell these ground-rents, but they deemed it inexpedient, owing to the state of the money market, to do so as yet. The cost of the properties required for the formation of this street was 102,881*l.* 0s. 8d., which, with other expenses, including professional and law charges, gave a total of 121,353*l.* 13s. 11d. In Southwark-street, which has been open for nearly three years, out of 206 plots, into which the surplus land in the line of the street had been divided, 177 have been let on lease, and the income derived from the ground-rents, including the rent of some warehouses purchased by the Board, but not pulled down, is 6,904*l.* per annum. The cost of the properties and interests purchased by the Board was 476,222*l.* 11s. 2d., and the professional and other charges swelled the total to 582,630*l.* 11s. 4d. The cost of the removal of Middle-row, Holborn, is estimated at 61,152*l.* The compensation claims for freeholds and leaseholds amount to 17,566*l.* 10s., and the settlements thereof to 15,950*l.* The net cost of the Whitechapel improvement is estimated at 115,364*l.*, and the Board have been engaged in purchasing the properties required up to March 31. The Board agreed to settle claims for three freeholds and four copyholds, &c. The sum claimed was 47,708*l.*; settled for, 42,818*l.* The quantity of land purchased for Finsbury Park was 120 acres, which cost 56,650*l.*, or about 472*l.* per acre.

The report states that the experience of last year fulfils the anticipations of the benefit to be derived from the increased purification of the river. These benefits are evidenced by the fact of the return of fish in large numbers to those

parts of the river which had before been in a polluted state; and further improvements are anticipated as arrangements for purifying the upper waters become matured, and a more efficient system of water-supply is organized.

On the subject of the Metropolitan Gas Acts, the report expresses the belief of the Board that these Acts "have been evaded by meter-makers, gas companies, and others."

A considerable portion of the report is devoted to the embankment and drainage works, with the progress of both of which we have already occasionally made our readers acquainted. It also contains an important communication by Mr. Bazalgette on the Ventilation of Sewers.

THE THAMES EMBANKMENT AND THE SEWERAGE.

Mr. BAZALGETTE presented, at last meeting of the Metropolitan Board of Works, a report, the substance of which is as follows:—

On the Northern Embankment (contract No. 1, between Westminster and Waterloo Bridges), about 3,730 ft. in length of iron caisson and timber coffer-dams have been constructed or are in various stages of progress: 2,637 ft. of the Low Level Sewer, 2,123 ft. of the subway, 2,925 ft. of the 4 ft. by 2 ft. 8 in. sewer hitherto discharging on the foreshore of the river, and 284 ft. of the flushing-sewer have been completed. About 3¾ ft. above Trinity high-water mark of the Westminster steam-boat pier for a length of 320 ft. have been completed; 45 ft. in length of the Charing-Cross steam-boat pier, and 306 ft. of the river-wall have been brought to heights varying 1 ft. to 4¼ ft. below Trinity mark. The Adelphi landing-stairs are progressing favourably; filling to the extent of from 400,000 to 500,000 cubic yards has been carried out behind the walls and works of the Embankment. The works that are dependent upon the operations of the Waterloo and Whitehall Railway are still in the same condition as at the date of the engineer's last report. The upper parts of the Embankment works to the westward of this point are waiting generally for stone to complete them. 8,269*l.* worth of work has been done during the last month. Between Waterloo Bridge and Temple Gardens (contract No. 2) about 60 ft. of river-wall, sewer, and subway are completed to within 4 ft. of Trinity high-water mark. Beyond this the only remaining portions of the work to be executed to complete the contract are the parapet and the upper part of the Temple steamboat pier, the stone for which is arriving on the ground. The approximate value of the work done, and of the materials and plant upon the ground, is 206,616*l.* Of the total amount, the proportionate sum of 195,319*l.* is or works, 8,297*l.* for materials, and 3,000*l.* for plant. But little progress has been made during the past month with the Isle of Dogs branch of the Low-level Sewer, in consequence of the contemplated alterations in the line of sewer near the East and West India Dock entrances. The value of the work completed is 59,558*l.*, of which sum 3,213*l.* represent the progress of the past month. Fair progress has been made at the Abbey-mills Pumping-station. The value of the work completed is 93,230*l.*, 5,230*l.* being for the progress during the last month. On the Southern Embankment a length of 2,370 ft. of dam and staging has been driven to a depth averaging 15½ ft. Within the dam about 1,600 ft. in length of the river-wall have been brought up to levels varying from 17 ft. 4 in. to 6 in. below Trinity high-water mark, and about 300 ft. of the wall have been brought to a level of 3 ft. 9in. above that mark.

THE TRADES MOVEMENT.

Manchester.—With a view to offer the more effectual resistance to the combinations of employers, and the action of locks-out, a movement originated in Sheffield, last July, for the formation of a national alliance of associations of the employed. The scheme has proceeded so far that the first conference of the alliance has been opened in Manchester, with fifty-six delegates accredited from fifty-four different trades in various parts of the country, including Scotland, and representing, it is said, an aggregate of 50,830 members of workmen's associations!

Neath.—The masons employed by Mr. Joseph C. Rees, contractor for the Wesleyan chapel, have struck work "in consequence of a disagreement with the clerk of the works, whom they consider not a practical man." Other masons employed by the same contractor threaten to strike unless Mr. Rees gives those already on strike other work not connected with the chapel; and every mason resuming work at the chapel while the clerk is employed on it will be held liable to a fine of 2*l.* until the strike be settled.

Sunderland.—Nearly 100 carpenters employed by Messrs. Taylor & Scouler, Sunderland, have struck work, in consequence of their employers not complying with their request to give them beer at three o'clock in the afternoon. It appears that in order to make the most use of the short days, Messrs. Taylor & Scouler caused their men to cease work 20 minutes to half an hour before time, and then gave them the beer. Their own men did not complain, but the union interfered, and the men are ordered to cease work until their employers agree to their request.

Hertford.—A convivial meeting took place at the Dicker Oil Mill, at Hertford, on Monday in last week. The men in the employ of Messrs. Inskip & Manser are in the habit of entertaining their employers to supper on Christmas Eve; and on this occasion the annual gathering was made the occasion of giving permanent expression to the feeling of confidence and good will between the firm and their working men.

EVICTED TENANTS' AID ASSOCIATION.

A NUMEROUS deputation from the Evicted Tenants' Aid Association waited upon the Earl of Derby, on Wednesday last, for the purpose of bringing under the notice of the Government the evils and miseries entailed upon the poor of the metropolis by over-crowding in their dwellings. The deputation urged that Parliament should be asked to pass measures compelling railway companies to provide dwellings for the poor evicted by their works; and, further, that Mr. Torrens's Bill of last session, for the rebuilding of dilapidated houses, and for otherwise providing houses for the poor, should be passed. Lord Derby replied,—I can only say there is not one of you feels a greater interest in this question than I do. It is a most difficult and painful subject to deal with; and I may say, on the part of my colleagues, it is one that has commanded our very anxious attention. If we can see the moment for introducing a measure at all satisfactory, we shall be most happy to carry it through, and to receive the co-operation and assistance of those who have studied the subject, and can render us valuable and efficient co-operation and assistance. It is not a question of party in any sense. It is a question of humanity, and it is also a question with respect to which we must bear in mind the maxims of economy. We cannot, on the part of the Government, make it a question of mere charity and philanthropy. If any mode can be shown by which we can mitigate the evils which are most excessive and painful, nothing will give us greater pleasure than to carry a measure which shall effect that through Parliament.

RAFFAELLE AND HIS WORKS.

UNDER this title Mr. Beavington Atkinson gave an interesting lecture at the Royal Institution, Bristol, on the 7th inst. After elucidating the first and second styles of Raffaelle by alluding to the Madonnas and holy families, of which he painted no less than fifty—the best known were especially commended for the simplicity and purity of their Christian sentiments—Mr. Atkinson remarked with reverence that Christian art, if true and positive and of any worth, must follow in the footsteps of Him who was at once human and divine. He then proceeded to discuss the questions of genius, and inspiration, and beauty in art, remarking that the Christian art into which Raffaelle threw himself was the embodiment of Christian truth and beauty. Raffaelle joined physical and spiritual beauty, and so made that enduring and ideal humanity which reconciled as it represented two natures. Thus laying aside all pretension to inspiration (the lecturer remarked) in any sense, he had endeavoured to show how from merely natural powers and materials Raffaelle matured Christian art. The genius he had ascribed to him infused into the manner of the period vigour, beauty,—in short, nature. Of the painter's third, or Roman period, it was remarked that it brought with it a vast development; and to it belonged the greatest pictures the world contained. When at the age of twenty-six Raffaelle travelled to Rome, he did not get rid of his Florentine manner; the two periods overlapped each other; there was no break in continuity, no sudden revolution, but merely progress through development. Directing attention to the Roman school generally, of which Raffaelle was the founder and chief ornament, the lecturer, the better to illustrate his observations, glanced at the intellectual and religious condition of Rome at the time, and then went on to show what compensations and advantages came to the Roman school of paintings under the changes he had just traced. He denied the charge that Raffaelle owed the greatness of his Roman style to Michelangelo, partly because, with the exception of one or two figures, such as Isaiah, there was nothing in common between the works of the two contemporaries, and also because there were other causes amply sufficient to effect the change from the Florentine to the Roman manner. Raffaelle had in style and mind grown into the man, and in Rome he entered a great and busy world which called forth his power. The support of patrons and the rivalry of the greatest artists of the age stimulated to utmost effort. He was also accustomed to take counsel of the learned men and leading intellects of the time, and thus they could in some measure understand how Raffaelle was called to the highest arguments, and as a painter representative of the times. Raffaelle, so far as he was not self-made, was fashioned by his age; in part he founded the Roman school, but that school had never been known had the city of Rome not existed. That city demanded a school; and it was not from Michelangelo, but from sculptors of a prior age that the school found patronage, whose works were then exhumed from the *débris* of the Roman empire. Indeed, no artist was removed from this world-wide influence. In the Roman style of Raffaelle this painting of many generations obtained its consummation. Raffaelle made the old art live and move; he saw nature through the classical, and from the classical he drew that which was eternally true. He made no dead transcripts from the Greek, but worked as the Greek artists would had they received from Julius and Leo commissions. They recognised in his lines the same grace, in his forms the same beauty, in his compositions the balance and the symmetry, in his humanity the ideal and transcendent types which brought Greek art so near perfection. This was the Roman school of which Raffaelle was the founder, or rather the reviver. The stern grandeur of the Greek was in his hands softened; it was in this blending of two schools, the Christian and spiritual of Florence with the grandeur and simple nature of the Greek, that the perfection of Raffaelle's Roman manner was reached.

PROVINCIAL NEWS.

Walsall.—The completion of the Town- or Guild-hall has been celebrated by a banquet given by the Mayor. The new building covers the same area as its predecessor, but is made to afford a greater amount of accommodation. The style is Italian. The chief façade towards High-street is a composition based upon a story of the Doric and Ionic orders of architecture. The inferior order which forms the lower part of the façade is Doric, upon a rusticated and vermiculated plinth, and presents a centre recessed with two corresponding wings. The centre is flanked with three-quarter columns, and the wings with tripled pilasters of the same order, supporting an entablature. The peculiarity of the site enabled the architects to introduce a Mezzanine story, which, although it to a certain extent destroys the harmony of the façade, has been artistically treated. The three windows, the magistrates' private entrance, and the three windows of the court room, form the centre, and are deeply recessed—each window having detached columns raised on pedestals, and carrying a denticulated entablature forming an impost, the walling throughout being rusticated. The keystone to the principal entrance, and also the keystones to the court windows, are enriched with carved heads, representing the four seasons, or rather four stages in life from childhood to old age. The superior order is Ionic, forming an arcade in connexion with the wings of five arches, the walling being executed in red brickwork, the main columns and pilasters having

enriched capitals with swags of fruit and flowers from the volutes and columns supporting the arcades. In the apertures between the columns are the windows of the council-chamber and ante-rooms on the same floor. Part of the façade is slightly broken up by the introduction of a niche, in which is placed the statue of Justice, from the entrance of the old guildhall. Three of the compartments, forming one arcade of the Goodall-street front, are in character with those composing the High-street front. The other part of the Goodall-street façade corresponds with the Free Library, which at some future day will no doubt be connected with it. The ground-floor comprises the court-room, the magistrates' private room, witness-room, and the Inland Revenue Office. From the day-room to the prison, which is underneath the court, a stair communicates with the dock, so that the prisoner passes direct from one to the other. On the Mezzanine floor is the grand jury room. The upper floor comprises the council chamber, mayor's private room, and the town clerk's room. The ventilation is effected by the introduction from the exterior of the building of cold fresh air, which is warmed, and passed through a series of flues to its destination. Fifty cubic feet of pure air per minute can be poured into the cells. The foul and vitiated air is drawn by means of a series of flues and channels into an extracting shaft, and so carried away. The building has been erected by Mr. Charles Burcott, of Wolverhampton, the amount of whose contract price was 5,083*l.*; and the warming and ventilating part of the work has been carried out by Messrs. Haden, of Trowbridge. The erection has been superintended by the architect, Mr. G. B. Nichols, of West Bromwich and London. Mr. Burton acted as clerk of the works.

COMPETITIONS.

Sheffield.—A new chapel is to be erected in Sutherland-road for the Primitive Methodists. The trustees invited designs for a chapel to seat 1,200, vestries, and schools, &c., from four gentlemen in a limited competition; and, after meeting several times, adopted the design submitted by Messrs. C. J. Innocent & Brown, of Sheffield, and appointed them the architects.

JERUSALEM.

SIR MOSES MONTEFIORE, Bart., has determined, since his return last spring from the Holy Land, to erect another hospice at Jerusalem for the residence of several poor Israelitish families. This building will be on a large scale, and built near to that which was erected in the year 1859, under the superintendence of Mr. William Edward Smith, architect, of Upper Bedford-place. The contemplated new building is entrusted to the same architect.

THE "OVER-HEATED FLUE" MISERY.

SIR,—How soon, I am bold to ask, are likely to cease irreparable destruction of fine old churches, or injuries to grand modern erections, (*vide* Croydon Church and the Crystal Palace), through the actually sickening recurrence, for some time, of "overheated flues?" And, pray, where might not be the *next* effect of the ill-omened flue?—St. Paul's, Westminster Abbey, or St. George's Chapel, Windsor?

The supposition is irresistible, that there must be often some great unskilfulness or inattention in those who manage them. But if they do not know their business, others should be employed who do. One can easily guess now, instantly, the *cause* of fires in public buildings. Really, sooner than this, we had better revert to the old "open-air registered stoves" (I think that is the title), with ascending pipe.

Reasonable comfort to persons in church is one thing; danger to the buildings from somewhat "Sybarite" luxury in exotic heating (which, if "cleanliness" be, is hardly also "next to godliness") is another. I dare say good St. James would not have discouraged the moderate warming of churches; but I am sure, if present in a London winter, he would have bid us remember the densely cold dwellings of the poor before luxurious seats in the temple.

Of the monuments sacrificed, Oxford should mourn Sheldon's, who so liberally ornamented it. The organ, I remember to have read, was pronounced by Avery his best and favourite work. He was, I believe, the first "great man" in pedal pipes, and put in those at Trinity College, Cambridge (the previous builders being Schmidt & Green), the finest organ in that university. On the whole, and such catastrophes—a "murrain on your pestilent flues"—is the rough thought of JONATHAN OLDBUCK.

INJURY BY NEIGHBOUR.

SIR,—Will some of your readers kindly inform me if I have any redress, and what, for a very serious grievance, viz., I am the landlord of a house let to a highly respectable widow with invalid daughters, and the next-door neighbour has just raised his house two additional stories; in consequence of which all the chimneys in my house smoke to that extent that the windows are obliged to be set open day and evening while the fires are alight. I have received notice from my tenant, who pays eighty guineas per annum, that she is going to leave in consequence of this annoyance.

Both houses are detached though only about 5 ft. apart.

Z. Z.

CEILINGS IN IRON HOUSES.

SIR,—I have a two-storied building at the Cape of Good Hope, with an iron roof, the upper story of which is unbearable in the summer months, on account of the heat. Can any of your subscribers inform me of the best and cheapest material of which to form a ceiling that will act as a non-conductor to the intense heat?

I may state, that the building is 70 ft. long by 24 ft. wide. Planking or matchboard lined with felt is generally recommended, but the land carriage (being 300 miles from the sea) makes plank expensive.

I have a notion that some sort of coarse flannel or blanket, lined on the upper side with brown paper and just stretched from wall to wall, would answer every purpose; but not being a practical builder, I hesitate to incur the expense without first asking for the experience of those well versed in such matters.

I may add, that should any inexpensive and effective ceiling be offered, a very large demand would immediately spring up.

G. P.

THE GREAT BELL OF YORK.

SIR,—It is seriously urged that the great bell of York Minster should be re-cast, "reducing the size to harmonise with the other bells, and attaching it to the clock, so that in future the quarters would be struck upon four bells, instead of two as at present; and the hours upon a clear, distinct, yet ponderous bell, heard without difficulty in every part of the city." Now, I would remark upon this plan, that to re-cast the great bell would spoil one of the finest and largest bells in Europe. The late Mr. Aspinal, of the Minster Gate, York, got up the subscription for this bell; and he had a list of subscribers' names, at the head of which was the Archbishop of York, for procuring machinery for the striking of the hammer to mark the hours on the bell, which subscription unfortunately was not carried out owing to his death. I heard the great bell of York Minster rung shortly after it was hung: the old foreman of Mears, of Whitechapel, London, where the bell was cast, refusing to leave York till it was rung, which was done by having sixty strands of rope attached to the main rope, and sixty men pulled it. Now, the machinery was estimated to have cost 30*l.* for striking the hours, which Mr. Aspinal was getting the subscription for. Let such a sum be raised for that purpose, and a further sum, the interest of which may pay the men for ringing on the great festivals of Christmas Day and Good Friday, and the old tower of York Minster will be used for what it was intended by our ancestors.

The late Dr. Canage, of York, took great pains to have the great bell of York Minster cast to the tone of the great bell of Notre Dame, at Paris, which is the finest toned bell in the world. I may mention that the great bell would be heard twenty-three miles round York if the hammer struck it with the machinery as a propelling power proposed by the late Mr. Aspinal.

When I heard it rung it was the most magnificent tone I ever heard of the kind; it sounded not like a bell, but the roar of old ocean.

YORKIST.

HOT-WATER PIPES AND THE BUILDING ACT.

THE Superintending Architect of the Metropolitan Board of Works writes to us as follows:—

"I enclose copy of a correspondence between Mr. Berry and myself respecting the heating apparatus lately put up by him for this Board under my superintendence, which was referred to by Mr. Berry in an inquiry before Mr. Trail, when a case was heard with respect to another apparatus supplied by Mr. Berry, all of which was reported in your paper, and several others.* I am sure you will say the correspondence is very conclusive; and in justice to myself I must ask you to insert as much of it as you may deem necessary in the *Builder*, in order to place me right as a public officer before the public.

GEORGE VULLIAMY."

It is, indeed, quite conclusive. After a bungling attempt to evade the real question, Mr. Z. D. Berry (Pimlico), writes,—

"In *no part* of your building are the pipes *within* the distance, and the coils in your case stand upon bricks, 9 in. by 4½ in. by 3 in."

Mr. Traill was led, therefore, to give an illegal decision by an altogether incorrect statement.

* See vol. xxiv., p. 961.

ILLUMINATED MSS. BY ENGLISHMEN OF THE TIME OF KING CHARLES I.

IN the last number (the New Year's number) of a small quarto weekly (nay, healthy) favourite with all scholars, "Notes and Queries," there is a notelet, full from the beginning to the "post-script" (that essential appendage to a lady's letter) of new matter about the last—to my thinking—of *illuminating* heralds attached to the venerable and valuable office of the Earl Marshal of England—rich in its names with "the blood of all the Howards." The writer of the article is Mr. John Bruce, a ripe scholar in English history and biography. How he can, in his humorous, roguish way, and with his rich mines of reading and remembering, puzzle by "Queries" they cannot answer and he can!—but I am not in your columns for "panegyric praise," only to relate something new and about the last of our Heralds' College, Heralds encouraged by the Earl Marshal of England and the nobility of England.

Mr. John Bruce asks from "You and Yours," "Pray what was a chain organ?" The answer to that "query" I leave to our friends Mr. William Chappell and Dr. Rimbault, long well-skilled correspondents. What I have to tell is *who* Edward Norgate was.

When a clerk under the Commissioners of Audit in Somerset House, many a Saturday afternoon hour (attendance closed) I have spent in the Archbishop of Canterbury's Official Will Office in Heraldic and Prerogative Doctors' Commons. Those were hard-paying separate shilling Calendar *searchings* in those days, and my dinner was often reduced in quantity by this longing for learning. There was no access such as now (Sir Herbert Jenner Fust then reigned), and I have—without bragging—often reduced two chops to one, for this, to me, pleasant and unprinted information.

Well, I found this information out touching Edward Norgate, and it is what in part Mr. Bruce asks to receive. There is an additional pleasure in being able to oblige a friend and a scholar—who rarely needs information but he knows where to find it for himself.

Edward Norgate, Clerk of the Signet to King Charles I., and Windsor Herald, made his last will and testament in 1649. It was proved in 1651. Our skilled illuminator and herald desires to be buried in the churchyard of St. Benet's, Paul's Wharf, in London, or in the churchyard of the Cathedral Church of St. Paul. He appoints his wife, Ursula Norgate (what was her maiden name?) his executrix; and attributes his leaving so little to the many disorders of the times. His unfinished picture drawings, engravings, and books, he bequeaths to that son who had caused him "the greatest trouble." Why? There are odd, unaccountable legacies to strangers, or omissions of the names of sons and daughters in thousands of wills, commencing "*In the name of God.* Amen."

PETER CUNNINGHAM.

CHURCH-BUILDING NEWS.

Treeton.—The chancel of Treeton Church has been restored, according to the *Sheffield Independent*, and the edifice re-opened. In the restorations the original design of the chancel has been so preserved that no old stone has been removed from the building. The interior was previously plastered and whitewashed, presenting a very unsightly aspect. Both plaster and whitewash have been removed, and the old stonework has been cleaned and pointed afresh. The chancel is of the twelfth and thirteenth century style of architecture. The restoration to its ancient form has been superintended by Messrs. Hadfield & Son, of Sheffield. Mr. Joseph Rodley, of Sheffield, has executed all the stonework, and Mr. Arthur Hayball, of Sheffield, all the woodwork. The four paintings of evangelistic symbols in the reredos were done by Mr. Westlake. Outside the church the mullions and tracery of the window at the east, and the other three windows, have been restored to their original form. Two pinnacles at the east end and a cross have had to be replaced. Ere long the church will be further beautified by a stained-glass window, a gentleman having promised to provide one for the chancel.

Kidderminster.—The alterations to St. George's Church have been brought to a conclusion, the whole of the east end having been re-modelled, altered, and improved, since the removal of the

pulpit and reading-desk from their former position. The first alteration comprised removing the screens, and throwing the additional space thus obtained within the communion-rails. One of the pulpits was also lowered. On the wall of the east end a carved reredos of Caen stone has been erected, the centre portion containing a large grouped carving of the Ascension. The decoration of the wall above the reredos has been done by Mr. Preedy, of London. Within the communion-rails encaustic tiling in a warm colour has been laid, supplied by Mr. Godwin, of Lugwardine. Around the front of the communion steps a metal railing, with suitable standards of polished brass, has been fitted by Mr. Skidmore, of Coventry.

Southsea.—The district church of St. Simon has been opened for divine service. The cost has been 4,000*l*. The church has been erected from the designs of Mr. Thos. Hellyer, of Ryde, architect, by Mr. Lawrence, of Southsea. It is built chiefly with white bricks, relieved with red brick bands, with moulded bricks in the interior, in the nave arcades and chancel arches, Bath and Portland stone being used for the windows, columns, caps, and bases. The style is Early Decorated, and the whole treatment is based on the brick architecture of the Continent. The chief peculiarity of the church is its wide and lofty nave, its width being 44 ft. from centre to centre of the columns supporting the nave arcade and clerestory, whilst the ridge reaches the height of 70 ft., with a length of 92 ft. in the clear. There are north and south aisles, each 74 ft. by 14 ft.; chancel, with apsidal end, 33 ft. by 18 ft.; chancel aisles, 21 ft. by 9 ft.; also lower story of future tower at the south-east, and the vestry at the north-east angle of the building, making a total length from west to east of 136 ft., including west porch, and a total width of 82 ft. from north to south. In addition to the west porch there are four other entrances, viz., north-west, south-west, and south-east porches, and entrance through vestry. There is also a west gallery, in which at present is placed the organ, by Messrs. Gray & Davidson. The church will accommodate 1,000 on the ground-floor, and eighty more in the west gallery. The roofs are open and stained throughout, that of the chancel being groined in wood, with molded ribs. The nave is lighted by a clerestory, containing twenty-four two-light windows, with traceried heads, and three large west windows, which, with the five apse windows, are all glazed with tinted rolled cathedral glass: the apse in addition contains five large quatrefoils, filled in with stained glass, by Mr. Wailes, of Newcastle. The *Hampshire Independent* gives the following somewhat curious account of the progress, if we may so call it, of the works:—

"It was originally intended to build only the nave and chancel with its aisles, and to add the other portions as funds were obtained. With this view the work was commenced in 1864. The Archdeacon of Winchester laid the first stone in September of that year, and the work proceeded as funds were collected until the 22nd of November, 1865, when, the roof being partly on, a heavy squall tore away the temporary braces and swept the whole off the walls, except one pair of principals, which turned completely over, describing a semicircle of 70 ft. diameter, in which position they remained stationary, thereby saving the clerestory walls and nave arcade, which at that time stood without any support from the aisles subsequently added; the timbers destroying in their fall the chancel arch, and damaging a triforia in the chancel walls. The roof was commenced again immediately, and boarded in by the 11th of February of the present year, when the terrific gale of that day moved the whole of the roof bodily 5 in. from south to north, thrusting the north wall out of the perpendicular to that extent, and dragging in the south wall to the same amount; the Portland stone shafts of the nave arcades were by this means thrown out of their vertical position, and two of them split from top to bottom. Means were immediately taken by the builder to secure the building by fixing chains to the feet of the principals on the north side, and securing them to balks of timber on the outside of the foundations of the south temporary wall; and after anxious deliberations by the building committee, it was decided to build the north and south aisles, the contractor undertaking, in consideration of the sum of 200*l*. being paid him towards the expenses, to get the roof back to its normal position, to pull down and rebuild the clerestory walls, also the west wall to the extent of 50 ft., and to further strengthen it by additional buttresses, and also to cut out the broken columns and replace them with new. All this with the additional work has now been accomplished successfully, the mode resorted to being the erection of a strong timber stage 30 ft. from the ground, loading it with 30 tons of materials, and bracing it sufficiently firm to obtain a fulcrum for twelve screwjacks, by which the roof was thrust back in its place, and is now firmly kept there by additional braces and wall posts secured to the roofs of the aisles."

Livesey.—The chief stone of a church, to be dedicated to St. Andrew, has been laid at Livesey, near Blackburn. The building will be from designs by Mr. E. G. Paley, of Lancaster and Merton, and after the type of ecclesiastical structures erected in England during the twelfth century. The ground plan is in the form of a cross, having an apsidal termination at the east end, and consists of a nave 85 ft. in length, transepts (north and south), 25 ft. 6 in. in width, and 64 ft. across. The seats will be open benches, having moulded ends and division framing. The north transept is devoted to children's benches. The church will be built of Darwen pier points, with quoins at the angles, the spire being built of ashlar.

Books Received.

Papers on Subjects connected with the Duties of the Corps of Royal Engineers, contributed by Officers of the Royal Engineers. New Series. Vol. xv. Printed by Jackson & Son, Woolwich. 1866.

THIS volume of professional papers contains, amongst others of a more strictly or exclusively military character, a useful paper on Representation of Ground, &c., in Sketching, by Captain Webber, R.E., and another on "Foundations on Treacherous Soil," by Captain Mitchell, R.E., the inventor of the screw pile. Of course, on the principle of "nothing like leather," Capt. Mitchell, ignoring concrete, recommends screw piles in such cases. The use of concrete in other circumstances is treated of by Lieut. Ardagh, R.E., in a "Report upon Concrete Revetments built at Newhaven Fort." There are other papers of some value on proposed substitutes for gunpowder, by Professor Abel, F.R.S., V.P.C.S.; on demolition with gun-cotton charges, by Major Miller, R.A., V.C.; and on the Fire-alarm Telegraph at Montreal (with map), by Lieutenant Grover, R.E. The first paper consists of "Brief Notes on the Career of the late Captain Fowke, R.E." by Mr. Henry Cole, C.B.

Miscellanea.

WORKSHOPS FOR THE BLIND.—In August last the Association for the Establishment of Workshops and Class-rooms for the Blind opened their first workshops in a three-storied warehouse in Commercial-street, Spitalfields, near Spitalfields Church; and last week the members of the committee invited the workmen and their friends to a substantial dinner in one of the rooms, which was decorated for the occasion. The committee has at its head the Archbishop of Canterbury, and includes such names as the Earl of Shaftesbury, the Bishop of London, Lord Ebury, Mr. G. Moore, Mr. Samuel Morley, Mr. R. C. Hanbury, M.P., and many others, who were moved to undertake this work from the knowledge that there are 3,000 blind persons in London, and that the greater part are in destitute circumstances.

THE DRY-EARTH CLOSET SYSTEM PROPOSED FOR NORWICH.—A communication has been addressed to the Sanitary Committee of the Norwich Board of Health, by an inhabitant of the city, recommending the dry-earth closet system for Norwich, instead of the proposed system of sewerage, which is to cost 60,000*l*. It is to be hoped the local authorities will not listen for a moment to the adoption of a system which, however well it may look in theory, is certainly impracticable with the mass of our town populations. Were they all sanitary reformers, or all blessed with intelligent discretion, such a system might be *tried;* but the case is notoriously otherwise, and the system in question would in reality become no system at all, but an abominable and general nuisance.

PRIVATE BILLS IN PARLIAMENT.—SESSION 1867.—According to the "General List" published by the Private Bill-office of the House of Commons, there are 317 bills in Parliament this year, 152 of which are railway ones; but of the 152 very few are for new railways. The others are for gasworks, waterworks, enclosures, improvements, and other miscellaneous works. The most important and, no doubt, the greatest fighting Bill of the session will be the Metropolis Gas Bill, by which it is proposed to put all the gas companies within the metropolitan area (of which there are twenty-two), under the control of the Metropolitan Board of Works, and to supply to the public gas of pure quality at uniform rates in all the districts, the rate proposed being 3s. 6d. per 1,000 cubic feet. The Metropolis Gas Bill will, no doubt, receive great support from the public, and unanimous opposition from the various gas companies.

YORKSHIRE ARCHITECTURAL SOCIETY.—The annual meeting of this society has been held in the School of Art, Munster-yard, York. The attendance was but small. The twenty-fifth annual report was read and adopted. It stated that the society maintained its ground, and was steadily advancing in position and working power. The Rev. Canon Raine read a paper, titled "A Survey of the Abbatial House of Howden," with several extracts from the original survey: and the Rev. J. R. Lunn, of Marton-cum-Grafton, read a paper on "The Ecclesiology of the Rural Deanery of Aldborough, Ripon."

KITCHEN BOILER EXPLOSION IN HULL.—The liability to explosion of kitchen boilers in the North of England is a remarkable circumstance, of which we have before taken note. An explosion has just occurred in Hull, from frost, it is believed, having arrested the flow of water into the boiler till it became red hot. One person was killed and another injured, while two windows were blown out by the explosion. Whether it be that many more boilers are fitted up with pipes in the north than in the south of England, or that there is some defect in the arrangement, is a question worth inquiring into. In the present instance, the pipes communicated with a cistern which was more exposed to the action of frost than it ought to have been.

ST. GEORGE'S, KIDDERMINSTER.—The east end and part of the side walls of this church have been beautified by the addition of a reredos, from the design of Mr. Jeffery Hopkins, of Worcester. It is of alabaster and inlaid marbles, with the Ascension, carved by Mr. Forsyth, of Worcester. An altar-rail and encaustic tile pavement have also been added. The upper part of the wall and first bay of the roof have been painted, from the designs and under the supervision of Mr. F. Preedy. The large surface of the wall is covered with a delicate diaper, on a parchment-coloured ground, and rich borders. There are eight medallions containing angels, on blue grounds, the larger and lower being the four archangels, Uriel, Michael, Gabriel, and Raphael; the other angels have instruments of praise. The roof is blue, with an ornamental centre, and powdered with stars, the bosses being gilt.

THE WINCHESTER DRAINAGE PLANS.—At a meeting of the town council acting as the local Board of Health, the committee reported that, in answer to advertisements offering premiums of 150*l*., 100*l*., and 50*l*. respectively for the best, second, and third plans for the main drainage of the city and suburbs, including schemes for disposal of the sewage, twelve plans had been sent in, and three other engineers had applied for an extension of time, which could not be granted. In answer to an inquiry from the committee, Mr. H. Newman, the surveyor to the Board, admitted that he was the author of one of the plans sent in, but he said he would withdraw it as a plan competing for a premium; but there it was for the use of the Board hereafter, if they chose to make use of it in any way. The report was adopted, on the understanding that the plans would be open to the members, but not to the public.

TRAFFIC RECEIPTS.—It appears from a Parliamentary return just issued that the total receipts on railways in the United Kingdom for the year 1865 amounted, on 13,289 miles, to 35,890,113*l*.; and for the year 1864, on 12,789 miles, to 34,015,564*l*; showing an increase in the mileage of 500 miles, and in the receipts of 1,874,549*l*. The total receipts for passengers, mails, &c., in the year 1865, amounted to 16,572,051*l*., against 15,684,040*l*. in 1864; showing an increase of 888,011*l*. The total receipts for merchandise, minerals, and live stock amounted, in the year 1865, to 19,318,062*l*.; and for the year 1864, to 18,331,524*l*.; showing an increase of 986,538*l*. The total working expenses amounted, for the year 1865, to 187,149,073*l*., or 48 per cent. of the receipts, against 16,000,304*l*., or 47 per cent. in 1864; showing an increase of 1,148,765*l*. The total number of passengers (exclusive of holders of season and periodical tickets) conveyed in the year 1865 on railways in the United Kingdom was 251,862,715, against 229,272,165 in the year 1864, showing an increase of 22,590,550. Of the 251,862,715 passengers 151,416,269 were third-class and Parliamentary, 70,783,241 second-class, and 29,663,205 first-class; against 136,301,581, 65,269,169, and 27,701,415, respectively, in the year 1864; showing an increase of 15,114,688 third-class, 15,514,072 second-class, and 1,961,790 first-class.

THE DUDLEY SURVEYORSHIP.—The Borough Surveyor (Mr. Bateman) has resigned his office, stating that he finds it impossible to conduct his private business and that of the Council without the interests clashing. There is said to be a strong feeling in the town with reference to the surveyor devoting the whole of his time to the duties of his office. The matter has been referred to the Public Works Committee.

CONGREGATIONAL MEMORIAL HALL.—The Congregational denomination of Dissenters are about to erect a memorial hall in London with the two-fold object of commemorating the ejection of the 2,000 Nonconformist ministers from the Church of England in 1662, and of providing suitable offices for the various societies in connexion with the Congregational or Independent Union of England and Wales, and also a large hall for public meetings. An eligible freehold has been purchased in the neighbourhood of the Mansion House. The works will be immediately commenced, and the estimated cost is about 70,000*l*. Towards this sum 50,000*l*. have been already raised. Mr. Titus Salt has just added his name to the subscription for 5,000*l*.

CO-OPERATIVE SOCIETIES IN SWITZERLAND.—A communication from Berne, in the *Moniteur*, publishes information as to the Swiss co-operative societies. Those for consumption, of which the mechanism is the most simple, have alone taken a large development as yet in Switzerland. That of Lausanne confines itself to procuring for its members articles of food of primary necessity at as low a rate as possible. The financial statement for 1864 shows a sale of butcher's meat to the amount of 143,566 fr.; bread, 23,510 fr.; and sundries, 8,939 fr.; with a total profit of 8,572 fr. In 1865 the amounts declined,—for meat, to 140,948 fr.; and for bread, to 21,657 fr.; with a profit of 6,718 fr. One which supplies every one, and acts as a kind of savings-bank for its members, producing results much more considerable, is that of Zurich, the amount of its transactions being 1,078,644 fr., with a net profit of 26,884 fr. After that come those of Vevey, Neuchatel, &c. A considerable number are now in existence in Switzerland, and fresh ones are being daily established.

THE LIVERPOOL SANITARY ASSOCIATION.—At a meeting of the members, held at the Common Hall, Hackins-hey, a report of the proceedings of the executive "with regard to the signatures and presentation of the memorial to the mayor and corporation on the water-supply of the town," was received and adopted. The memorial set forth that the comfort of the inhabitants necessitated a very large and constant supply of pure water, and that the sanitary changes which it was proposed to introduce would render such a provision absolutely indispensable. The memorialists, therefore, respectfully requested that the authorities would, with all convenient speed, determine upon such a large and comprehensive scheme as would effectually meet this difficulty for a long series of years. Mr. Samuelson said the fact had been elicited that whilst it only cost the town 2*l*. per million gallons for water from Rivington, it cost 8*l*. per million gallons from the wells. Manufacturers were charged 9d. per 1,000 gallons, which was something like 36*l*. per million gallons. He was of opinion that a report should be prepared showing how far salt water could be utilised.

ST. MARY MAGDALENE'S, WALKERINGHAM.—A scheme for placing a stained-glass window in St. Mary Magdalene's church at Walkeringham, near Gainsborough (diocese of Lincoln), was set on foot three years since. This Advent has witnessed the consummation of the efforts made by the vicar's wife and her "Mary" friends. The stonework having been restored from the designs of Mr. Drury, of Lincoln, at a cost of 25*l*., the stained glass has been added at an outlay of 75*l*. more. There remain, however, about 10*l*. to be made up by Marys (or in devout memory of Marys) not yet enrolled. The subjects, designed and executed by Mr. Preedy, of London, are the Epiphany, Purification, Flight into Egypt, Doctors in the Temple, Marriage at Cana, Entombment, and exorcism of the patron Saint (introducing the Mary of Scripture, and illustrating the rites of churching, catechizing, wedding, burial, and absolution), with legend, ✠ "The west window was restored A.D. mdcccixvi., the stained glass thereof being given to this church of St. Mary Magdalene by more than 700 namesakes of the Blessed Virgin and the Penitent Saint who loved much."✠

ANOTHER VICTIM TO A BAD DRAIN.—We are informed by one who ought to know that last autumn a medical man of station drew the attention of the local police to a foul drain passing close by the house at Wardie of Mr. Alexander Smith, the poet, and assured them that cholera, diphtheria, or typhoid fever would prevail if it were not cleansed. It was, we believe, by one of these discreditable disorders that Mr. Alexander Smith has been carried off.

MR. SPURGEON'S ALMSHOUSES AND ORPHANAGE.—The Rev. C. H. Spurgeon has just concluded the purchase of 2½ acres of land, adjacent to Clapham Common, upon which the buildings for the purposes of a new orphanage, under his auspices, will be erected. It is, however, not intended to commence the whole structure at once. In the centre of the site, the schools, chapel, and other necessary buildings, will be first proceeded with; after which small houses will be reared, in which the children can live, to the number of ten or twenty to each. It is true, as stated some time since, that a benevolent lady has placed a sum of 20,000*l*. at his command for the purposes of the orphanage; but it is accompanied by a condition that only 8,000*l*. out of it shall be spent, the remaining 12,000*l*. to go to capital account for the permanent benefit of the institution. The first batch of orphans will number fifty. The almshouses and day schools, which will stand next to the Metropolitan Tabernacle, at Walworth, are now sufficiently advanced to admit of the laying of the foundation stone.

SAW TEETH.—A patent has been recently allowed in the United States to Mr. W. P. Miller, of San Francisco, for saw-teeth constructed upon an improved plan, which are claimed by the inventor to possess the following advantages over all others, as reported in the American *Gaslight Journal*:—"The teeth being nearly encompassed in the plate, are rendered immeasurably stronger than even solid teeth formed on the plate. For the reason of their great stiffness laterally, these saws may be fully one-fourth less in thickness than solid teeth, and one third less than other insertable teeth-saws. The teeth are self-attaching and adjustable in their sockets, thereby differing from any other saw-teeth. Should the point of one or more of them become broken, by simply turning them forward in their sockets they will attain the necessary projection; then file them, and the damage is repaired. These saws remain exactly the same size, and never can get out of round nor balance. They cannot by any means be thrown out of their sockets, and hence the operatives are secure from injury. The teeth remaining in order need not be reduced to accommodate those that may be dull or broken. They are alike applicable to circular saws of every size and for all purposes, and are peculiarly adapted for cutting-off saws, as well as for splitting."

TENANT'S RIGHTS IN MINERALS.—A case of some public interest, as affecting the right of tenants for life under settlements to work minerals, was decided by Vice-Chancellor Wood on the 19th ult. Tenants for life may work mines already opened; but if not empowered to commit waste, may not open new mines for their own benefit, and the question has been often raised,—what amount of previous working renders a mine open, so that tenants for life may work it for themselves? The plaintiffs in this case were Colonel Stepney and his two sons, who are the present owners of the Stepney estate, in South Wales; and the defendant was Mr. William Chambers, who is the executor of a late tenant for life of the estate, who was not by the terms of the will of the settler authorised to commit waste. On coming into possession of the estate, however, he granted a lease of all the coal under certain farms forming part of the estate, and the suit in question was instituted for the purpose of recovering the amount of the royalties received under this lease. The defendant contended that the mines were open ones at the date of the settlement, and that it was consequently not waste in a tenant for life to work them; and in support of his view he proved the existence on the farms of an old trial pit, and a considerable amount of superficial working at the outcrop of the various seams of coal on the side of the mountain. The Vice-Chancellor, however, held that workings of this description did not amount to an opening of the mine, and gave the plaintiffs a decree with costs.

ENGLISH ENTERPRISE IN RUSSIA.—A telegram informs us that on Tuesday evening last, the works of the Moscow Gas Company were opened, that the city was lighted, and the whole a great success. Mr. Frederick Leslie is the company's engineer. Allowing for the difference of time between the places, the news came from Moscow to Piccadilly in five hours.

THE SUPPLY OF WATER.—Her Majesty's Commissioners for the purpose of ascertaining what supply of unpolluted and wholesome water can be obtained by collecting and storing water in the high grounds of England and Wales, either by the aid of natural lakes or by artificial reservoirs, at a sufficient elevation for the supply of the large towns (the Duke of Richmond; Sir John Thwaites; Colonel Harness, R.E.; Sir B. S. Phillips, one of the aldermen of the City of London; Mr. T. Elliot Harrison; and Mr. Joseph Prestwich), are to report—1. Which of such sources are best suited for the supply of the metropolis and its suburbs; and, 2. How the supply from the remaining sources may be most beneficially distributed among the principal towns.

TENDERS

For alterations, &c., to Dock House Tavern, East India-road. Mr. W. Barrett, architect:—

Langmead & Way	£1,096 0 0
Sheffield	1,068 0 0
Phillips	760 0 0

For two houses, with shops, in Rotherfield-street, Islington, for Messrs. Tubbs, Lewis, & Co. Mr. William Smith, architect. Quantities not supplied:—

Taylor	£3,079 0 0!
Madgin	1,700 0 0
Johnson	1,485 0 0
King	1,478 0 0
Saby	1,396 0 0
Crabb	1,386 0 0
Hunt	1,362 0 0
Grover	1,346 0 0
Cubutt	1,021 0 0!

For alterations, No. 164, Fenchurch-street, City. Messrs. John Young & Son, architects:—

	Estimates. No. 1.	No. 2.	Total.
Chessum	£869 0 0	£526 0 0	£1,395 0 0
Ashby & Horner	832 0 0	518 0 0	1,350 0 0
Henshaw	786 0 0	477 0 0	1,263 0 0
Webb & Sons	798 0 0	447 0 0	1,245 0 0

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